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Table of Contents

Vol. 39, No. 7 — June 27, 1940

News Developments

Trends ... 27
Texas Cuts Allowable to Cope With Emergency ... *R. Marne Sanford* 30
Three Tankers Added to National-Defense Fleet ... 30
Pennsylvania Grade Outlook Promising ... *J. P. O'Donnell* 31
Sparks From the News ... 32
Swensrud Tells Kentuckians Industry Can Meet Needs ... 33
Spread of European War Restricts Export Outlets ... *H. Stanley Norman* 34
Few Foreign Orders on Gulf ... *Neil Williams* 35
News From State Capitals ... 36
Editorial: 1940—Second Half ... 37
Domestic Gasoline Demand 6 Per Cent Over Year Ago ... 38
Deaths ... 38
Wiess Sounds Warning at Permian Meeting ... 39
Independents Join Opposition to Pipe-Line Bill ... *W. V. Howard* 40
Dr. R. E. Wilson to Be Adviser on Technical Oil Problems ... *Henry D. Ralph* 41
International ... 43
Pipe-Line Projects and Refinery Activity ... 44
Natural-Gas News and Natural Gasoline ... 45
Program Page ... 46

Kansas Section

Steady Expansion in All Phases of Oil and Gas Operations ... *Dal Dalrymple* 28
Kansas Today ... 47
Rotary and Cable Tools Used in Kansas Drilling ... *Harry F. Simons* 49
Central Kansas Uplift Has Several Prolific Pays ... *E. A. Koester* 50
Kansas Oil Reserves Estimated at More than 750,000,000 Bbl. ... *W. V. Howard* 52
Cumulative Production in Eastern Kansas Fields ... 52
Western Kansas Being Provided With Two New Pipe-Line Outlets ... *J. Campbell Stirling* 54
Economies of Slim-Hole Drilling Attract Operators' Attention ... *F. W. Heiser* 56
Kansas Operations by Fields ... 58
Current Developments in Drawdown Method of Taking Potentials in Kansas ... *Marshall Brown* 63
Geologists and Scouts Play Big Role in Kansas Development ... 67
Large Gas Reserves Insure Many Years' Supply ... *J. H. Page* 69
Stratigraphy of Kansas ... *Raymond C. Moore* 73
Water Flooding in Kansas ... *Paul Reed* 77
Most of Kansas' Output Comes From Water-Drive Fields ... *Eugene A. Stephenson* 79
Eastern Kansas Has Produced Bulk of State's Output ... *Dal Dalrymple* 86
Twenty Active Refineries in Kansas ... 98
Mississippi Limestones in Central and Eastern Kansas ... *Wallace Lee* 102
Forest City Basin Prospects Improve ... *Dal Dalrymple* 107
Kansas Fields Served by 17 Pipe-Line Systems ... 110
Kansas Conservation ... *T. A. Morgan* 113
Kansas Wells Benefited by Slower Withdrawals ... *H. F. Simons* 114
One-Fourth of Kansas Area Leased for Exploration ... 118
Service on Active Fields: Hal-Gurney Field, Russell County, Kansas ... 122

Engineering—Operating

Suggested Field Practices: Proper Selection of Prime Mover Leads to Pumping Economy ... *T. P. Sanders* 124
Questions on Technology ... *W. L. Nelson* 125

Other engineering articles will be found in the special Kansas section

Field Operations

Field Operations Summarized ... 127
Illinois, Indiana, Kentucky ... 128
West and Central Texas and Panhandle ... *D. H. Stormont* 130-149
Kansas and Missouri ... *Dal Dalrymple* 131
North and East Texas *D. H. Stormont* 132
Oklahoma ... *Dal Dalrymple* 133
Among Drilling Contractors ... 134
Rocky Mountain Area *T. R. Ingram* 136
California ... *L. P. Stockman* 137
Louisiana and Arkansas *George Weber* 138
Gulf Coast ... *Neil Williams* 139
Southwest Texas ... *F. L. Singleton* 140
Eastern Fields ... *Staff Correspondent* 141
Michigan ... *Otto C. Pressprich* 142
Canada ... 144
Key to Abbreviations ... 145
Wildcats ... 145
Mississippi ... 150

Markets and Prices

Crude-Oil Prices ... 149
Group 3 Market ... *T. F. Smiley* 154
New York Market *H. Stanley Norman* 155
A.P.I. Refinery Report ... 155
Tank-Wagon Market ... 156
Refinery Prices ... 157

Additional Features

Equipment News ... 151
Personal Paragraphs ... 152
Classified Advertising ... 158
Advertisers' Index ... 160

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AN OPEN LETTER TO:

BAKER OIL TOOLS, INC.

MAIL ADDRESS: POST OFFICE BOX 127 VERNON STATION

CABLE ADDRESS "BACASO"
MAIN OFFICE AND FACTORY
6000 SO. BOYLE AVENUE

LOS ANGELES, CALIF.

OPERATORS INTERESTED IN CEMENTING

It is generally agreed that the proper landing and cementing of casing is one of the most important steps in drilling a modern oil well.

But exactly what does the term "cementing" mean? It used to be that to many operators "cementing" meant merely pumping the desired amount of slurry down the casing and discharging it through practically any type of Shoe on the end of the string . . . hoping enough cement would be placed around the Shoe and behind the pipe to get a shut-off and reenforce the casing. Later, when the Shoe was drilled out and the job tested, if it was found dry, the cementing operation was considered a complete success.

But times have changed, and so has the modern operator's conception of what a "good" cement job not only "is" but "must be." Today a cement job must stand TWO tests . . . one the water Shut-off Test . . . and the other the test of time, if with proration and other factors restricting and regulating oil production, it is becoming increasingly important that the normal producing life of an oil well not only be maintained but actually prolonged if the initial investment, to say nothing of anticipated profits, are to be recovered.

This long-range, profit-return program calls for a consideration of all factors which influence the life expectancy of an oil well . . . which goes right back to "cementing," for the effectiveness of the cement job performed determines to a considerable extent the length of time that an oil well will be a profitable producer.

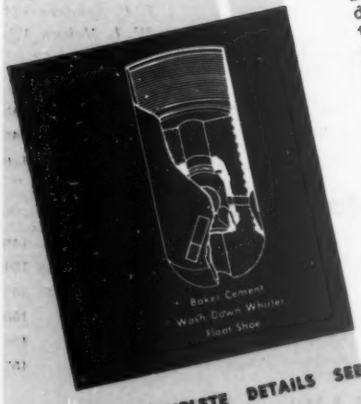
Baker Oil Tools, too, has recognized this fact and has accordingly made available to the oil industry a type of Shoe that field records have proven to be the most efficient unit for Guiding, Floating and Cementing casing that has yet been devised. It is called the Baker Cement Wash-Down Whirler Float Shoe (see illustration). This type of Shoe is designed to afford results that not only insure the safe landing of casing strings but also the best possible chance for a successful cement job under all conditions . . . the type of job that has the best chance to stand up for the normal life of an oil well.

If you have not investigated Baker Cement Wash-Down Whirler Float Shoes it will pay you to do so.

Yours very truly,

J. Sutter

BAKER OIL TOOLS, INC.
General Manager



FOR COMPLETE DETAILS SEE PAGES 223-225 OF THE BAKER SECTION OF THE 1940 COMPOSITE CATALOG

BAKER OIL TOOLS, INC.

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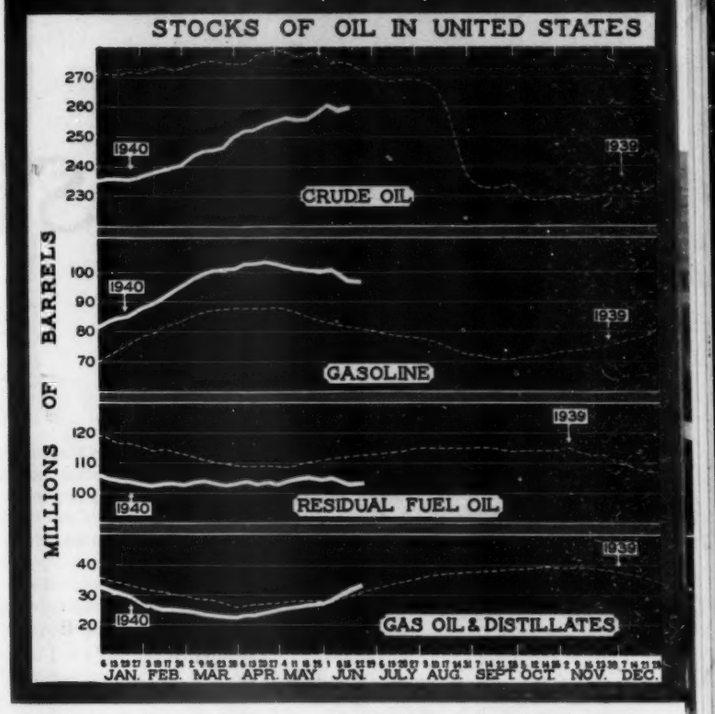
Trends

Declining Exports Bring Adjustments In Domestic Areas



THE important developments of the past week could be traced to changes in the European war. With the Mediterranean and western European markets shut off, oil exports from this country and the northern part of South America have been reduced to a minimum. The Texas Railroad Commission is attempting to cope with the problems of reduced refinery requirements by ordering additional shutdown days and reduced allowables for several areas next month.

CRUDE PRODUCTION *3,845,387 bbl. daily average—up 26,389 bbl. One year ago 3,463,656 bbl.*

CRUDE STOCKS *259,800,000 bbl. as of June 15—up 94,000 bbl. One year ago 274,852,000 bbl.*

GASOLINE STOCKS *97,276,000 bbl. as of June 22—down 384,000 bbl. One year ago 81,462,000 bbl.*

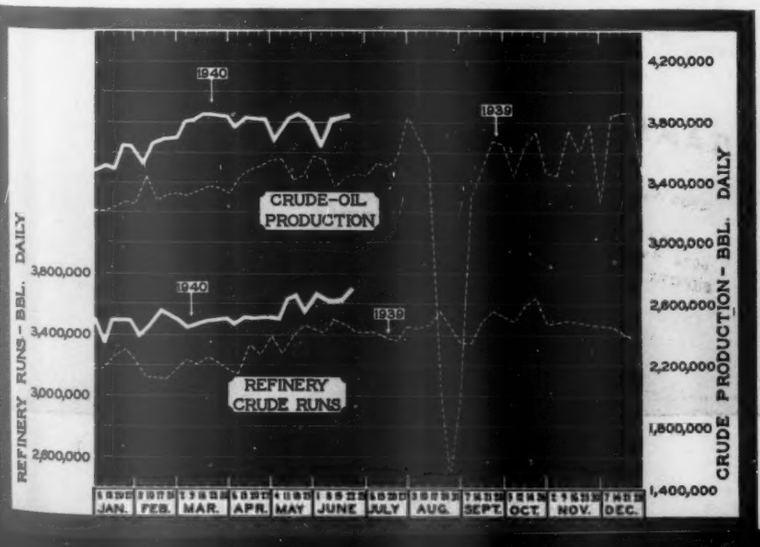
RESIDUAL FUEL-OIL STOCKS *104,683,000 bbl. as of June 22—up 264,000 bbl. One year ago 112,199,000 bbl.*

GAS OIL AND DISTILLATES *32,751,000 bbl. as of June 22—up 865,000 bbl. One year ago 30,658,000 bbl.*

REFINERY RUNS *3,690,000 bbl. daily week ended June 22—up 70,000 bbl. One year ago 3,430,000 bbl.*

The dearth of export business has resulted in additional tankers being available for coastwise shipments from the Gulf Coast, and tanker rates have dropped as much as 50 per cent from their recent highs. Quotations around 40 cents per barrel for tankers were reported the first of the week. These lower rates were partly responsible for reductions in gasoline prices at important consuming points in the East.

The reduced tanker rates have served also to make Gulf Coast crude more competitive with Illinois crude in shipments to Canada and the Atlantic seaboard. This situation, plus an increase in Illinois output to more than 500,000 bbl. daily, has brought weakness in the Illinois crude market for the first time this year. Present Illinois production exceeds the available pipe-line outlets, and some crude has been offered under the market. This development has also had its reactions in Mid-Continent markets. Because of large flush production in the Centralia area one large company has discontinued its pipe-line movement out of Oklahoma and is obtaining all of its crude supplies for middle western refineries from Illinois. The company is storing a large part of its crude-oil production and its purchases in Oklahoma and Kansas. This company expects that its flush production in Illinois will be short-lived and that its pipe-line movement from the Mid-Continent will be resumed in the near future.


1940
1939
CRUDE-OIL PRODUCTION
REFINERY CRUDE RUNS
REFINERY RUNS - BBL. DAILY
CRUDE PRODUCTION - BBL. DAILY
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

DAILY AVERAGE PRODUCTION FOR WEEK

	June 22, 1940	Bur. Mines June est. of demand	June state allowables	June 15, 1940
Oklahoma City	102,300	.....	.....	81 900
Seminole fields	38,250	.....	.....	39,075
Remainder of state	278,775	.....	.....	285,675
Total Oklahoma	419,325	408,600	408,600	406,650
East Texas	397,000	.....	.....	396,996
West Texas	239,248	.....	.....	238,000
North Central Texas	134,840	.....	.....	138,750
Texas Panhandle	66,255	.....	.....	67,841
East Central Texas	82,391	.....	.....	83,756
Gulf Coast Texas	375,400	.....	.....	369,088
Southwest Texas	104,553	.....	.....	103,809
Total Texas	1,399,687	1,344,600	1,335,530	1,398,240
North Louisiana	68,895	.....	.....	69,065
Gulf Coast Louisiana	222,800	.....	.....	226,497
Total Louisiana	291,695	274,700	280,166	295,562
California	607,650	593,700	592,000	635,250
Kansas	178,350	159,000	178,000	170,650
Arkansas	72,450	66,700	70,517	71,605
Mississippi	11,605	7,000	.....	10,750
Eastern fields	106,900	106,400	.....	106,500
Illinois	502,177	395,600	.....	478,491
Michigan	55,878	62,000	...	56,690
New Mexico	107,320	106,700	107,000	106,230
Rocky Mountain area	92,350	95,300	.....	82,380
Total United States	3,845,387	3,620,300	.....	3,818,998

The large increase in Illinois production has upset calculations which assumed that the output of that state would decline sharply the second half of the year. This decline has been postponed at least several weeks. Weakness in several refinery products in the Mid-Continent is another sequel of this continued expansion in Illinois.

Few predictions are heard as to the immediate trends in export shipments to Europe from the Gulf Coast and other points. Great Britain's sources of supply in the Mediterranean and the Far East have been greatly reduced, and this may bring increased orders to the Western Hemisphere. At the same time it is pointed out that so long as Great Britain retains control of the seas there will be no oil shipments from this country to France and other conquered countries of western Europe.

Rigging up portable rotary in the Burnett pool

Steady Expansion Kansas Oil and

By DAL DALRYMPLE

MORE than a billion barrels of crude petroleum have been taken from the sands and limestones of Kansas since the first oil well in the Mid-Continent field was drilled near Paola, in Miami County, in 1860. More than 400 oil and gas pools have been opened in the state during the 80 years that have marched on since that initial discovery. The productive area has been extended far beyond the boundaries of the original oil country, until 61 of the 104 counties now produce either oil or gas, or both.

Today Kansas is fifth among the oil states in estimated reserves, with a total of 756,000,000 bbl. Its reserve is exceeded only by those of Texas, California, Oklahoma, and Louisiana.

It is sixth in daily average production, with 170,650 bbl. daily as of June 15. It holds this position despite strict proration and a comparatively small market, only Texas, California, Illinois, Oklahoma and Louisiana having greater daily production.

It has a daily potential of 5,384,182 bbl., a figure that places it high among the oil-producing states. It has been estimated that the Kansas potential is exceeded only by that of Texas.

Impressive figures, these. Yet, oil men who have studied the Kansas field carefully are confident they will be surpassed greatly when the state obtains a share of the crude market proportionate to its productive possibilities.

The Kansas petroleum industry has traveled a long road, and a hard road, to attain its present high position among the oil states. From time to time it has looked as if the industry was to go places and do things, but something would come along to throw a monkey wrench into the machinery. There would be a resultant lapse, and then the industry would move forward again, surpassing its previous records.

The Civil War caused the first setback. Dr. W. G. Brown, editor of a Conneautville, Pa., newspaper, and associates drilled the first wildcat test west of the Mississippi River in Miami County, probably in Section 14-17-24, in June 1860. Location was on a lease spread of 30,000 acres, the first big block to be assembled in the state. Drilled in a 4-in. hole, the first wildcat was dry at 100 ft. Another 100-ft. failure was recorded and then, near the old Baptist Mission east of Paola, a third test was drilled to the then deep zone of 275 ft., and the first oil was found. It had peak output of 1 bbl. daily, with much water, but that Paola wildcat rates as the discovery well of Kansas and of the Mid-Continent. A severe winter delayed additional drilling, and then the war between the states put an end to all further activity for several years.

Exploration was resumed after the war. Prof. G. C. Swallow, then state geologist, made a geological report mentioning numerous "tar springs" and other evidences of the presence of oil in Miami County. Several wells were drilled and the first oil in Wyandotte County was found in 1870. The activity was extended to Shawnee, Bourbon, and Cherokee counties, where oil seeps were found. Commercial gas production was found 7 miles northeast of Paola in 1882, and the first commercial oil well was completed 6 miles east of Paola in June 1886. A few additional producers were drilled, the heavy, dark oil being sold for axle grease at $3 to $5 a barrel.

Prospecting was started in the Neodesha-Fredonia area of Wilson County in 1890, and in 1893 Guffey & Galey completed the first commercial producer in southeastern Kansas near Neodesha. That well, a 12-bbl. producer, led to widespread activity in southeastern Kansas and the discovery of numerous pools in the eastern and southeastern counties. Kansas' first widespread activity resulted in the so-called "million-dollar boom" and by 1904 annual production soared to more than 4,250,000 bbl. The Kansas industry was growing rapidly.

Then came the next big setback, with the opening in 1905 of the Glenn pool in Oklahoma, following the discovery of oil at Bartlesville. Development of several big fields in Oklahoma was reflected in the decline of Kansas production from its 1904 peak to a low of 1,128,000 bbl. in 1910.

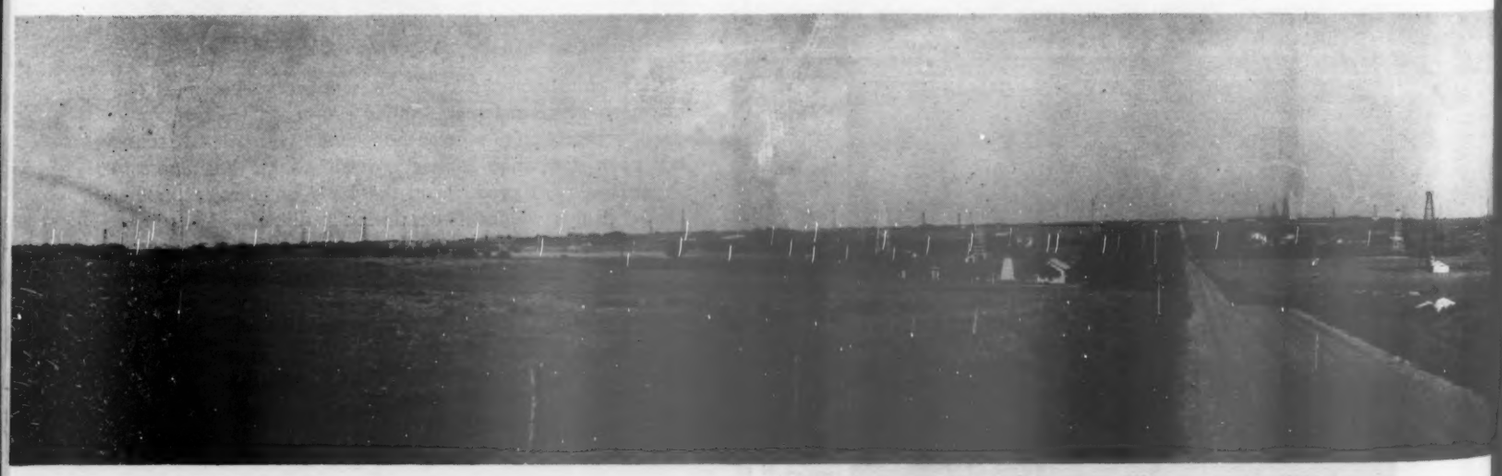
The next Kansas upswing followed the finding of oil in Butler County in 1914, and when the great Eldorado field was opened in 1916 the Sunflower State found itself with a boom that vied with Cushing, Healdton, and other major developments in Oklahoma. So intense was the development and so large the producers in Butler County, Kansas production soared to more than 45,450,000 bbl. in 1918, a peak that was not be surpassed until 1934. Development of the shoestring-sand pools of Greenwood County and oil discoveries in Cowley and other southeastern counties followed the Butler County boom, and far southwestern Kansas came into the picture in 1922 when the Liberal gas pool was opened in Seward County.

About the time the Butler County boom began to wane, the Ranger and Burkburnett fields in Texas were opened, and again Kansas suffered. The big play swung southward to the Lone Star

FEATURING KANSAS

A special section devoted to oil and natural gas operations in Kansas starts on Page 47.

The Hittle field, Cowley County, scene of some of the biggest producing wells ever drilled in Kansas



in All Phases of Gas Operations

State and Kansas development lagged, production declining to 28,250,000 bbl. in 1923.

That year was featured by a discovery that was to change the entire oil picture in Kansas. This was the opening of the Fairport field in Russell County, the first pool to be found in western Kansas. The Fairport discovery, followed by the opening of the Welch pool in Rice County in 1924, was the spark that set off a far-flung wildcatting campaign that extended to nearly every western Kansas county and resulted in the development of such major fields as Gorham, Ritz-Canton, Burrton, Chase, Silica, Trapp, Bemis, and others. The western Kansas campaign continued until 1937, when annual production reached a new high of 70,835,000 bbl., and that under strict proration.

But it didn't keep up. The next blow to the Kansas industry came with the discovery of big, new fields in Illinois. Kansas, with its proration and lack of market, couldn't keep pace with the more conveniently placed Illinois fields. Both production and operations declined sharply, the field work sinking to a modern low in 1939. There has been a considerable increase in activity this year to date, and now it looks as if the Kansas industry may be heading for bigger and better developments.

While production and activity in Kansas has varied through the years, the daily potential production has increased steadily. At the end of 1933 total potential for the state was 288,957 bbl., according to Corporation Commission figures. This has climbed steadily, thanks to the development of western Kansas fields and the completion of many big producers, until an all-time peak of 5,384,182 bbl. was reached June 1, 1940. Over that same period, the number of producing wells increased from 18,791 to 19,931. The greatest number of producing wells was recorded in May 1936, when the total was 19,766. Subsequent abandonment of exhausted producers and stripper wells reduced the total to 17,010 in February 1937, but since then new producers have more than offset abandonments.

After the drab years of 1938 and 1939, it looks like better days are ahead for the Kansas industry. Certainly, 1940 will surpass its two predecessors in the amount of field activity and total production.

Field operations and completions this year to date are considerably greater than in 1938 and 1939, although yet far from the high marks of 1937. Comparative figures:

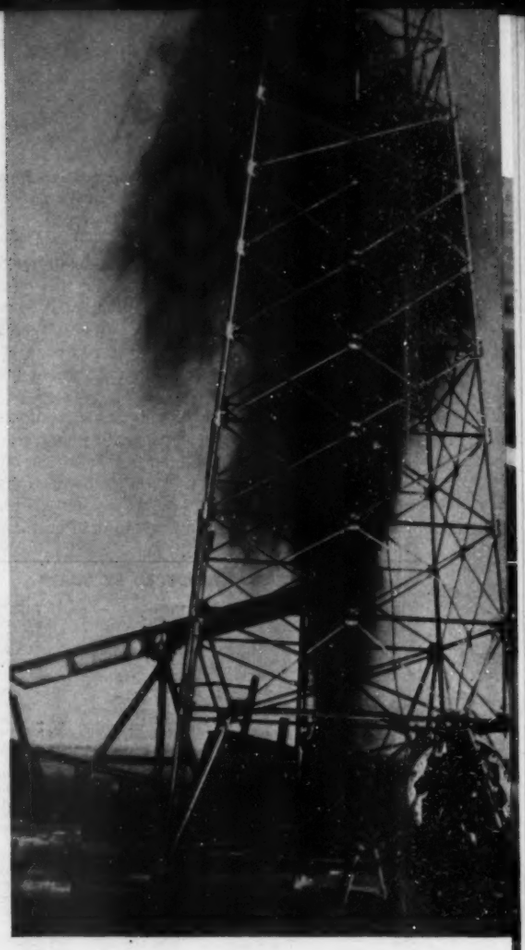
COMPLETIONS

First 5 months, 1937	1,006
First 5 months, 1938	764
First 5 months, 1939	472
First 5 months, 1940	680

OPERATIONS

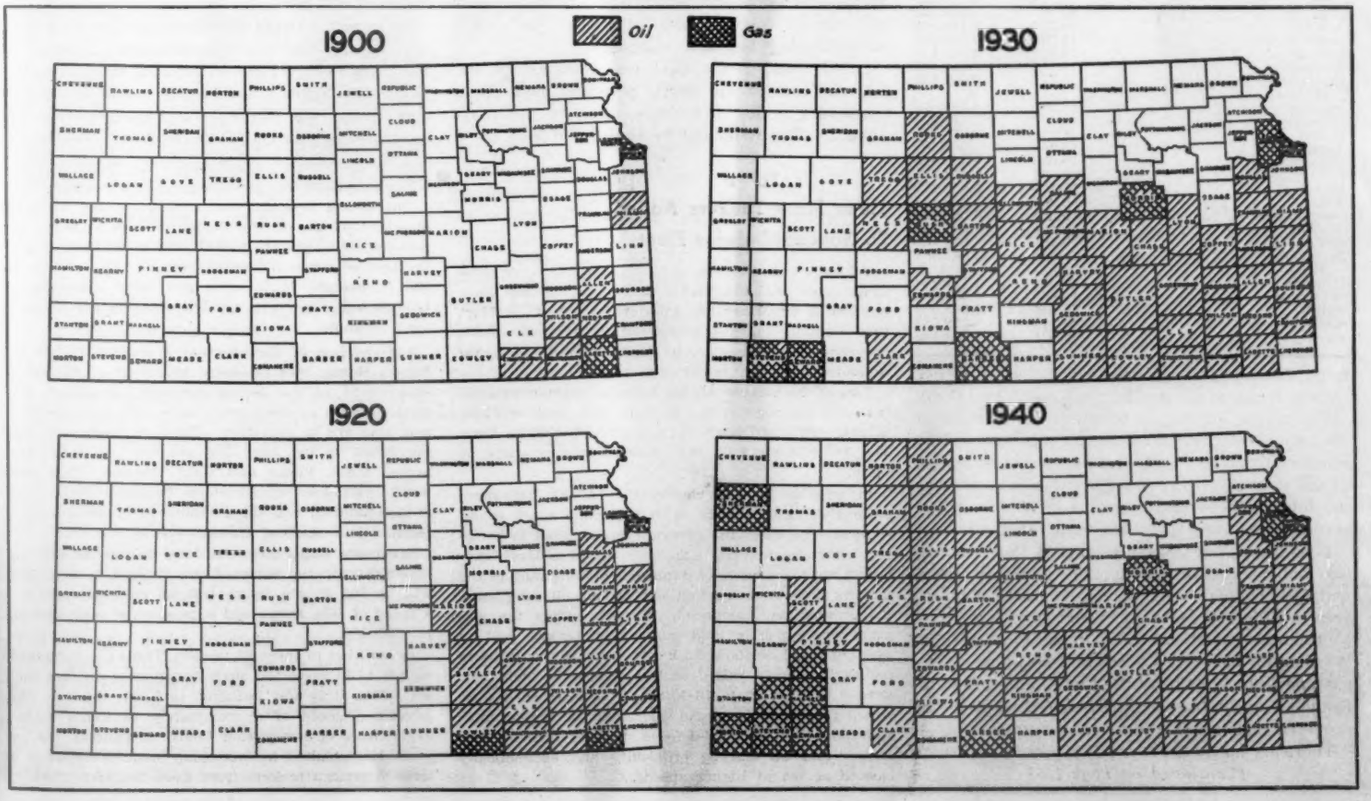
On June 1, 1937	468
On June 1, 1938	202
On June 1, 1939	246
On June 1, 1940	286

These figures are for all of western Kansas and the more active flush areas of eastern Kansas. They do not include a considerable number of op-



Above: W. J. Coppinger's No. 1 Whelan, Section 29-31-11w, in action. This producer recently extended the Whelan pool, Barber County, and started a new program of drilling activity

Below: Maps showing the spread of oil and gas-producing areas from 1900 to 1940



erations and completions in the eastern stripper fields, for which accurate reports have not been made.

Operations continue to increase, some 50 new tests, including 15 wildcat and extension wells, being reported the past week. So far this year, the increase in operations and completions has been in or on the edges of proven areas. Wildcat operations have not kept pace, but in recent weeks there have been evidences of an upsurge in outlying exploration work.

Many leases in or near proven fields along the Central Kansas uplift are approaching expiration dates. Kansas landowners have been oil-wise, and many are slow to lease their lands for bonuses and rentals as low as in the past. Accordingly, operators are finding it advantageous to drill on many promising tracts in order to keep the leases, rather than to renew at advanced rentals, or to lose them.

The market outlook is brighter. It is predicted the national demand for crude oil this year will be greater than ever, and Kansas operators expect to share in that increase. This was evidenced at the June market-demand hearing in Wichita, when several purchasers increased their nominations.

Pipe-line outlets are increasing. A line recently was laid from the refinery at Phillipsburg to Rooks and Ellis county fields. A line from the Burnett area in Ellis County to a connection with a transcontinental carrier 127 miles to the northwest in Washington County. Work is under way on a new gas line from Wichita to the Cunningham field in Kingman and Pratt counties, and several other proposed lines are in the formative stage.

There are no excessive crude stocks in the state.

(Continued on Page 120)

TABLE 1—CRUDE PRODUCED BY YEARS

Year—	Production	Year—	Production
1889	500	1916	8,738,077
1890	1,200	1917	36,536,125
		1918	45,451,017
1891	1,400	1919	33,048,000
1892	5,000	1920	39,005,000
1893	18,000		
1894	40,000	1921	36,456,000
1895	44,430	1922	31,766,000
		1923	28,250,000
1896	113,571	1924	26,836,000
1897	81,098	1925	38,357,000
1898	71,980		
1899	69,700	1926	41,498,000
1900	74,714	1927	41,069,000
		1928	38,596,000
1901	179,151	1929	42,813,000
1902	331,749	1930	41,638,000
1903	932,214		
1904	4,250,779	1931	37,018,000
1905	3,750,000	1932	38,848,000
		1933	41,976,000
1906	3,627,000	1934	46,482,000
1907	2,409,521	1935	54,787,000
1908	1,801,781		
1909	1,263,764	1936	58,226,000
1910	1,128,668	1937	70,835,000
		1938	59,230,032
1911	1,278,819	1939	58,768,943
1912	1,592,796	1940 (5 mo.)	*25,265,017
1913	2,375,029		
1914	3,103,585	Total	1,054,863,147
1915	2,823,487		

*May estimated.

TABLE 2—POTENTIAL TOTALS

	Total No. of wells	State potential
1938—		
January	18,006	3,069,880
February	18,071	3,086,640
March	18,195	3,042,370
April	18,252	3,043,559
May	18,317	3,246,800
June	18,398	3,313,449
July	18,465	3,409,525
August	18,504	3,484,810
September	18,590	3,603,253
October	18,652	3,526,125
November	18,718	3,564,082
December	18,779	3,651,120
1939—		
January	18,842	3,687,016
February	18,872	3,713,327
March	18,949	3,918,418
April	18,984	3,965,380
May	19,039	4,021,338
June	19,097	4,048,981
July	19,177	4,156,475
August	19,268	4,258,174
September	19,323	4,368,422
October	19,421	4,541,908
November	19,461	4,633,185
December	19,541	4,641,594
1940—		
January	19,649	4,711,054
February	19,669	4,883,303
March	19,744	5,013,093
April	19,835	5,218,583
May	19,931	5,384,182

Texas Cuts Its Allowables to Cope With Emergency

By R. MARNE SANFORD

FORT WORTH, Tex., June 24.—To prevent waste of crude due to production in excess of market demand, the Texas Railroad Commission last week at an emergency state-wide hearing in Austin, issued a new proration schedule effective Saturday, June 22, cutting the aggregate daily allowable of all Texas fields by about 300,000 bbl. for the remainder of June. During July and August the state's flow will be kept about 39,000 bbl. under the Bureau of Mines estimate of consumer demand.

This sudden action by the commission due to the collapse of foreign markets, revamped the whole Texas proration program as issued on May 24, which was to have remained in effect during the 3 summer months.

The new order carried certain definite changes for different districts of Texas, some being cut in daily allowables and others being materially raised. Perhaps most significant was that the East Texas field, starting July 1, will receive an increase in daily production of about 60,000 bbl. This increase is partly due to the decision of the U. S. Supreme Court upholding the commission in the Rowan & Nichols case. The court's decision meant the commission could return the field to its former proration according to 2.32 per cent of the hourly potential. This the commission did, with the exception of leases operated by Rowan & Nichols Oil Co., which are still exempt from the 2.32 per cent basis by the injunction granted on June 14, 1939, by the U. S. District Court at Austin.

The plan of the new commission order may be summed up as follows:

1. Contrary to the May 24 order which required the shutting in of all wells in Texas only on the first day of each month, the new order shuts in all wells in Texas each Sunday of July and August and also on July 4, a total of 5 closed days each month during July and August.

2. The East Texas field was returned to the 2.32 per cent of the hourly potential basis for a temporary period of 15 days, effective Saturday, June 22. The field will be shut down 5 of the 9 days from June 22 to June 30 and during July and August will have 5 shutdown days each month. The shutdowns during the remainder of June will decrease the field's allowable 127,000 bbl. daily from the order issued May 24. Beginning July 1, with 5 instead of 14 shutdown days each month, the field will rise in daily production from 367,674 bbl. to 425,000 bbl.

3. With the proration order for the East Texas field only temporarily fixed, the commission set July 2 for a hearing at Kilgore on which to base a permanent order. The commission is expected to adopt permanently the working order it has set up for use until the hearing.

4. Ten fields in South Texas which had been operating under higher than normal allowables to meet demands for foreign markets, were cut 17,110 bbl. daily, effective Saturday, June 22. These fields, with their new daily average allowables, are:

Field	County	New daily allowable
Conroe	Montgomery	25,580
East White Point	San Patricio	9,423
Plymouth	San Patricio	8,183
Tomoconnor	Refugio	19,106
Longhorn	Duval	2,067
La Rosa	Refugio	3,166
Alice	Jim Wells	1,645
Ben Bolt	Jim Wells	2,300
Rincon	Starr	1,347
Tom Graham	Jim Wells	1,102

5. The Texas Panhandle field was given a daily allowable raise, effective July 1, of approximately 20,000 bbl. by boosting the per-well quota from 14.6 to 20 bbl. The Panhandle district's new program gives it a daily allowable of 83,409 bbl., subdivided as follows:

	Bbl. daily
Panhandle proper	82,180
Osborne area	526
Moore County area	703

In general, Texas operators and companies expressed approval of the commission's action. The main criticism following the new order was that Texas had again absorbed the brunt of unstable conditions. The Gulf Coast foreign-market collapse was primarily a Texas problem, however.

Three More Tankers Added To National-Defense Fleet

With the award of contracts for construction of three single-screw national-defense tankers to the Sun Shipbuilding & Dry Dock Co., Chester, Pa., the U. S. Maritime Commission has completed its original tanker program conceived as one of the first requirements for rejuvenation of the American merchant marine.

Two of the vessels will be built for Seamar Tankers, Inc., and one for Kaymar Tankers, Inc., both of Philadelphia, Pa., affiliates of Keystone Tankship Corp. The commission will pay national-defense costs on these.

In addition to the construction of 23 high-speed national-defense tankers, with sufficient speed to accompany the fleet, the program has resulted in bringing commercial-tanker standards up to a level very nearly approaching Navy requirements on many of the tankers under construction for various oil companies, the commission announced. Whereas before the program was begun in 1938, commercial tankers had an average speed of about 12 knots, many major oil companies have now raised tanker speeds on their new vessels to from 15 to 16 knots. This increase has resulted from the successful operations of the commission-sponsored national-defense tankers which have shown that oil can be efficiently and economically carried at sea at higher speeds.

The tanker program was started in 1938 when the Standard Oil Co. of New Jersey ordered 12 twin-screw national-defense tankers with the commission paying the cost of national-defense features. The vessels are 553 ft. overall, 75 ft. wide and have a capacity of 145,000 bbl. They are capable of operating at better than 18 knots.

This portion of the program, sponsored by the late Robert Hague, vice president in charge of the marine department of the Jersey company, is almost complete. Eleven of the vessels have now been launched and nine are in operation. Three of them have been purchased by the Navy and are now the U.S.S. Cimarron, U.S.S. Platte and U.S.S. Neosho. Two more were purchased by Keystone Tankship Corp. which is also building two ships similar to those ordered by Seamar and Kaymar Tanks, Inc.

Six more single-screw national-defense tankers are underway for the Socony-Vacuum Oil Co., Inc. They will be 501 ft. 7½ in. overall, 68 ft. wide, will have a speed of 16½ knots, and a capacity of approximately 129,000 bbl.

In addition to these 23 vessels, Texas Co. voluntarily agreed to increase the shaft horsepower on four tankers which it is now building, to 9,000 s.hp. and thus provide a speed of approximately 16 knots without expenditure of commission funds. In general, the program has resulted in increasing shaft horsepower on large American tankers from 4,000 to about 7,500.

Pennsylvania Grade Outlook Promising

By J. P. O'DONNELL

BRADFORD, Pa., June 21.—Pennsylvania oil men took the Pennsylvania Grade Crude Oil Association apart at its seventeenth annual meeting here this week, studied its administration, functions and achievements and then put it together again, convinced that it is essential to their well being, that Pennsylvania products have maintained their rank and that the long-range outlook for the industry is at least as promising now as ever. Two hundred members of the producer-refiner-jobber

PARKER L. MELVIN
New president, Pennsylvania Grade Crude Oil Association

association attended the meeting, which was as unique as the association itself.

All the speakers, with one exception, were representatives of the association's various activities. After presenting their case, they submitted to a crossexamination from the membership in a radical departure from the usual trade-association program.

J. E. Moorhead, executive secretary of the association, launched the meeting with a candid description of its problems and how it is meeting them. Its principal problems, he said, are guarding against misrepresentation and meeting the increasingly intense competition of manufacturers of other oils. The latter, he continued, have so narrowed the margin of superiority from the standpoint of specifications and have placed so much emphasis on the marketing of motor oils that any relaxation on the part of the Pennsylvania industry will force it to drop out of the race.

Mr. Moorhead, assisted in his presentation by members of his staff, described the policing activities of the association by its field men. He exhibited a large number of motor-oil cans mislabeled to give the consumer the impression he was obtaining a pure Pennsylvania oil. These misrepresentations were detected by the field men and in each instance the practice was stopped. Elimination of such practices is first taken up with the offender, Mr. Moorhead said, and then, if cooperation is not obtained, legal action is taken. The association has yet to lose such a case, he said, and detailed one that is now before the U. S. District Court by which it is expected to establish further legal precedent for upholding the association's emblem and the name "Pennsylvania."

Because of small volume and high transportation rates, Pennsylvania refiners are unable to distribute gasoline nationally and therefore are dependent on independent jobbers for outlets for their motor oils, Mr. Moorhead said. The independent jobber was almost squeezed out of business a few years ago, but is growing in number now and, as a result, opening new outlets for Pennsylvania oils. Only one refiner member has voluntarily left the association in 6 years, he added, and predicted that that place would be filled within a year. The producer membership has declined more, proportionately, probably as a result of low crude-oil prices.

New Markets Needed

The greatest need of the Pennsylvania industry today, he concluded, is the development of more domestic customers. Its important export market has been greatly curtailed as a result of the war and, while there is a possibility that national-defense measures may help some, he held that only an expanded domestic market will relieve the pressure that is bearing on the industry today.

Dr. Merrell R. Fenske, director of the petroleum-research laboratory at Pennsylvania State College, graphically demonstrated the highly complex nature of the hydrocarbon combinations in lubricating oils and said that because of this, the Pennsylvania refiner, operating on one grade of crude, is better able to know his oil and its possibilities than a refiner operating on a variety of crudes. He cited this as one reason why the Pennsylvvania refiner should be able to maintain his place in the lubricating-oil picture.

Dr. Fenske also pointed out that a typical Pennsylvania 180 neutral contained 61 per cent of material having a viscosity index of more than 100 to show that if a viscosity-index race is ever under-

(Continued on Page 42)

Top: G. N. Holbrook and K. R. Cochran, Empire Gas & Fuel Co., Wellsville, N. Y.; and K. E. Planis, Ebenezer Oil Co., Hornell, N. Y. Second row: D. T. Andrus, Bradford producer, and J. C. Martin, executive secretary, Bradford district, Pennsylvania Oil Producers Association. Third row: Fayette B. Dow, counsel, and A. E. Booth, first vice president, Pennsylvania Grade Crude Oil Association. Fourth row: George Clinger and W. F. Clinger, Clinger Oil & Gas Co., Tidioute, Pa. Bottom: W. S. Zehrung, president, Pennzoil Co.; C. F. Stevenson, vice president, South Penn Oil Co., Bradford, Pa.; and C. L. Suhr, chairman, Pennzoil Co., Oil City, Pa.

SPARKS . . . FROM THE NEWS

WRONG DIRECTION: The trouble with Nebraska's oil boom from the standpoint of Nebraskans is that it is moving toward the Kansas line.

SECOND BIRTHDAY: June 21 was the second anniversary of the discovery of oil in the Salem area in Illinois. The field, now the second largest in this country, has produced upward of 87,000,000 bbl. of oil.

IN USE: Factory sales of motor vehicles the first 5 months totaled 2,083,892, a gain of 26 per cent over same period last year. No one who has attempted a Sunday afternoon drive doubts that all of these new cars, plus 30 million old ones, are being used.

MORE MARKETS: A large pipe-line company serving the Middle West with Kansas and Texas Panhandle natural gas will enlarge its system at a cost of $2,800,000, making a total expenditure of more than $6,000,000 in the past 6 months. Assurance of more markets is the explanation.

THIRD-GRADE FUEL: It is reported some of the German airplanes brought down in England were using 62-octane gasoline, the equivalent of third-grade motor fuel sold to car owners in this country.

SEVEN-DAY RECORD: Illinois' production passed 500,000 bbl. daily, Centralia became the state's second largest oil field with a 100,000-bbl. daily output, and the basin's largest well was completed.

LAND-OFFICE BUSINESS: Many refiners are doing a land-office business because their jobber customers wish to get ahead of the one-half cent additional federal tax on gasoline which becomes effective July 1.

TRIPLE THREAT: As the industry analyzes the Johnson Act, designed to cripple the pipe-line industry, it becomes increasingly apparent that producers and refiners will be the major sufferers if the act passes.

EXPERT CARVERS: Germany and Italy, in carving France, have reserved to themselves all of that country's 19 refineries. Partly destroyed by retreating Frenchmen, most of these plants can quickly be rebuilt when and if the necessary materials are available.

MORE TANKERS: With European shipments greatly reduced more tankers are now available for coastwise movement and rates have been reduced substantially.

NO SHUTDOWN: With the suggested shutdown of fields frowned upon at Washington and by most operators, the Texas Railroad Commission will attempt to solve its problem of shrunken markets with scattered reductions in the state's crude output.

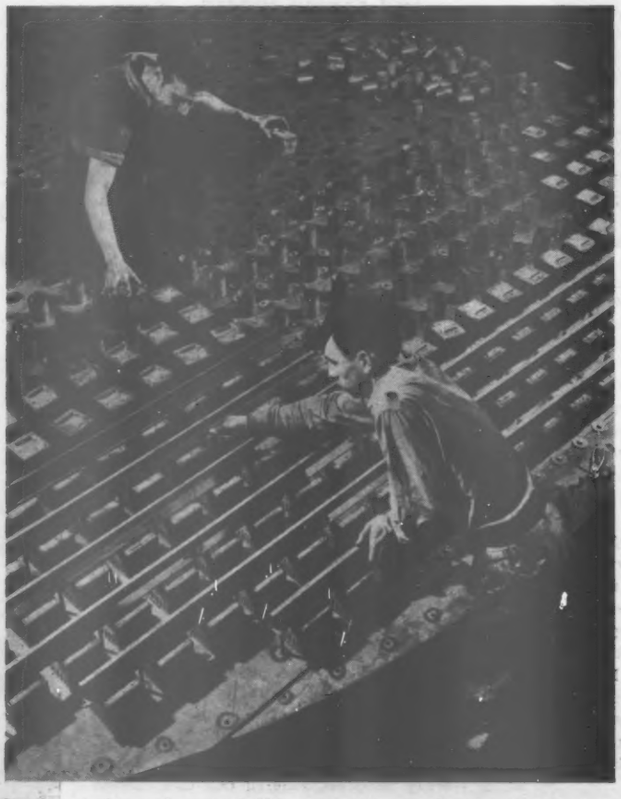
OPTIMISM: Two 25-cent cuts in prices recently did not dim the enthusiasm of producers of Pennsylvania Grade crude holding their annual meeting at Bradford.

KANSAS HAS IT: As revealed in a special section of this issue, Kansas has the reserves, fields, pipe lines, manufacturing facilities and vast unexplored areas.

YOUTHFUL: Indicative of the youth of petroleum, a 90-year-old visitor attending the meeting of the Kentucky Oil and Gas Association recalls its entire history.

LARGEST BASIN: The Permian basin, which rightfully claims to be the world's largest oil basin, celebrated at Odessa with a convention and exposition of equipment used in that area.

INSIDE THE FRACTIONATOR



Stainless steel tray of mammoth 21-ft. vacuum tower at Baytown, Tex., refinery of Humble Oil & Refining Co. Picture courtesy of Carnegie-Illinois Steel Corp.

Swensrud Tells Kentuckians Industry Can Meet Needs

LEXINGTON, Ky., June 22.—The annual midsummer meeting of the Kentucky Oil and Gas Association, held here yesterday and today, attracted over 200 members. Friday morning technical papers were read. Presiding at the session was Dr. A. C. McFarlan, head of the University of Kentucky geology department. W. J. Barnett, of Mattoon, Ill., read a paper on "Gas Injection in the Louden, Ill., Field"; Coleman D. Hunter, of Ashland, Ky., presented a paper on "The Historical Background of the Eastern Kentucky Gas Fields"; and Sam Stith, of Frankfort, Ky., assistant state geologist, discussed "Prospects for Deep Production in Kentucky." Mr. Barnett's paper was discussed by R. J. Sullivan, of Mattoon; Mr. Hunter's by O. W. van Petten, of Charleston, W. Va., and Mr. Stith's by George Wesley of Owensboro, Ky., and by D. J. Jones of Frankfort, state geologist.

The principal speaker at the annual banquet, held at the Ashland Club Friday night, was Sidney A. Swensrud, of Cleveland, Ohio, vice president of Standard Oil Co. of Ohio. His topic was "The Federal Government's Relation to the Oil Industry." Two principal reasons were cited for government control of the oil business. These were, first, the desire of many individuals in the Government "to extend their power by gaining a larger degree of control" of the industry; and, second, a valid interest by some toward conservation of natural resources. Branding the first motive as "just ordinary ambition and lust for power," he continued: "I think we should continually resist this pressure. We have seen too many examples of what happens if forces which tend toward dictatorship and bureaucracy are not successfully resisted."

Concluding, Mr. Swensrud said:

"There are many ways we could conserve gasoline without serious hardship, assuming that there was a necessity for doing so in order to meet our defense requirements.

"Whenever petroleum conservation becomes a critical problem in this country there are many approaches to it besides that of federal control of oil production at the well. Probably some of the leading consumption states could conserve more oil by requiring some simple governor on the accelerator than could be done by the most bureaucratic control of oil production at the well.

"One of the critical problems in defense considerations is transportation. In this respect the oil industry of the United States has about the finest system that could possibly be imagined. The country has a veritable network of more than 120,000 miles of crude-oil and gasoline pipe lines; we have over 150,000 tank cars, a tremendous tanker fleet, and I expect we have more tank trucks than most countries have total motor vehicles. If we need more of any of these things there is ample capacity to produce them in a short time. If it were decided that for emergency national-defense purposes a new pipe line from the Illinois area, for example, or even from the Mid-Continent, to the Atlantic seaboard were desirable, such a line, apart from right-of-way problems, could be constructed in a few weeks. And there is in the industry a highly skilled and experienced personnel capable of promptly coordinating all of these transportation facilities on an industry-wide basis.

"As for supplying aviation gasoline, the industry is already equipped to make far more high-octane aviation gasoline than the airplanes yet built in this country require, and the capacity for additional production of such gasoline, in the opinion of refinery authorities, can and undoubtedly will be increased more rapidly than additional airplanes can be built. We should not forget either that the oil industry, without, so far as I know, any help from the Government, is now prepared on short notice to commence producing substitutes for rubber in quantities sufficient to cover our whole national requirements.

"So far as national defense is concerned then, there is, we believe, no possible need or occasion for government control or intervention. The defense authorities of the Government have only to make known their requirements and the oil industry of its own accord will do everything that is necessary and do it expeditiously."

Coleman D. Hunter, chief of the department of geology and research, Kentucky-West Virginia Gas Co., in his address said:

"Kentucky is truly a geological paradise. Gas to supply large markets is produced from the following formations listed in descending order and percentage of number of producing wells:

	Per cent
Pennsylvanian:	
Salt sand	7
Mississippian:	
Maxon	9
Big lime, Indian, Keener	8
Weir	5
Berea	2
Devonian:	
Devonian shale	61
Corniferous	8

"All of the above formations outcrop between Lexington and 50 to 60 miles to the east. The largest continuous field is that of Floyd, Knott, Pike, Martin, and Magoffin counties. In this area over 2,500 gas wells have been drilled, of which 75 per cent are still producers. Over 70 per cent of these wells have been drilled since 1926. This developed area is approximately 65 miles in length and 25 miles in width.

"In this area over 65 per cent of the open flow developed comes from the Devonian shale and many of the present shallow producing wells will be deepened to the shale upon depletion. The development of the shale is of interest when we consider that the practice of shooting the 500 to 600 ft. of Carbonaceous shale with 4,500 to 6,000 lb. of gelatin is responsible for its commercial production. From 1,600 shale wells in this area, only 9.7 per cent were natural producers and were not shot, 34.6 per cent had absolutely no open flow before shot, 70.9 per cent made less than 100,000 cu. ft. before shot and would have been noncommercial were it not for results obtained with gelatin.

"In all eastern Kentucky, which includes the Big Sandy gas field; Ashland, Boyd County; Weir and Red Bush, Johnson County; Rothwell, Menifee County; Turkey Knob, Owsley County; Himyar gas field, Knott County; Oneida and Burning Springs, Clay County; and others, there have been 3,298 producing gas wells drilled, of which over 65 per cent are still producers."

Other speakers were Mr. Watkins and Lawrence Smith, of Tulsa, director of research, Independent Petroleum Association of America. N. W. Shiarella, of Owensboro, Ky., president of the association, presided. S. S. Yantis, Lexington attorney, was toastmaster.

VETERAN SPEAKS—Dean of members of the Kentucky Oil and Gas Association which held its midsummer meeting at Lexington, Ky., June 21-22, was E. D. Watkins, 80, of Ravenna, Ky., second from the left, shown examining core samples obtained from Kentucky operations. At his right is Maurice G. Powers of Huntington, W. Va., vice president of the association. Left to right on the other side of Mr. Watkins are N. W. Shiarella of Owensboro, Ky., president; M. A. Arvin of Owensboro, vice president; E. L. McDonald of Lexington, secretary

Spread of European War Restricts Export Outlets

By H. STANLEY NORMAN

NEW YORK, June 25.—Petroleum markets that absorbed 111,000 bbl. daily of United States crude and products last year and a daily average ranging from 70,000 to 85,000 bbl. for the first 4 months of 1940 have been closed by the European war. In these bald data can be found the reason why the Texas Railroad Commission and the Louisiana Conservation Commission ordered production of crude cut back for the next 2 months.

The real impact of the war in choking off United States petroleum imports was not exerted until Italy joined Hitler and France sued for an armistice. France and Italy are two of the four largest customers for United States petroleum. Isolation of the Scandinavian market by Germany's invasion of Denmark and Norway was a serious blow to this country's petroleum-export trade, but it was mild compared to what has followed. The list of countries previously absorbing important quantities of United States petroleum but now dormant in this trade total more than 15, exclusive of miscellaneous consumers on the coasts of the Mediterranean.

Since the middle of June all shipments of petroleum from the United States to France and Italy have ceased.

The major ports and terminal facilities of France have been destroyed along with refineries and 1 to 2 years of rebuilding will be necessary before that country can possibly return to its former position as a large consumer of petroleum. Its naval consumption and merchant-marine demand is apt to fall with the armistice.

The consuming countries for American petroleum in 1939 now isolated by the war include Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Sweden, Turkey, Egypt, Algeria, and Morocco.

Influence of the Allied blockade against Germany has grown more evident since the turn of the year. Great Britain and France launched control of shipping early in the war to prevent discharge of more than internal petroleum requirements from reaching the small neutral nations in Europe which had transportation links with Germany. This tight control and the natural inclination of neutral European nations to conserve their petroleum reserves for defense combined to reduce petroleum consumption throughout Europe. Furthermore, all governments in Europe are now exercising more or less control over civil consumption of oil and only the necessary demand has been filled since the war started last September.

Since the start of the year United States petroleum exports to European nations now completely isolated have declined in daily average by 46 per cent, or from an actual daily average of 111,119 bbl. in 1939 to 75,747 bbl. in the first 4 months of 1940. The oil exports from this country in May were not materially changed from the preceding 4 months, but in the middle of June when Italy and other Mediterranean consumers were removed by Mussolini's declaration of war against the Allies and more recently by developments in France, the bottom virtually fell out. Nearly 38 per cent of all United States crude-oil exports in January went to countries now completely out of the market. More than 13 per cent of January motor-fuel exports, over 22 per cent of gas-oil and distillate fuel-oil shipments, almost 10 per cent of residual fuel oil and approximately 25 per cent of lubricating oil went to European countries now extinct or dead marketwise for all practical purposes.

Map of France showing refinery centers. A list of French refineries was published in The Oil and Gas Journal, May 30, 1940. Boundary of Italian occupied area approximate

In February the European countries now isolated from the United States petroleum-export market absorbed 32 per cent of crude, about 23 per cent of the motor-fuel shipments, over 14 per cent of the gas oil and distillate fuel, only a little over 6 per cent of the residual fuel but about 21 per cent of the lubricating oils shipped abroad that month.

EXPORTS FROM UNITED STATES

March 1940

	Crude	All motor fuel	Gas oil	Lubricating oils
Belgium	.....	.....	36,150	8,988
Denmark	.....	.....	.....	76
France	1,109,280	22,032	.....	23,405
Greece	.....	.....	.....	521
Italy	396,267	20,685	.....	113,053
Netherlands	.....	46,631	106,973	26,885
Norway	.....	668	116,175	18,464
Sweden	45,554	192,253	110,527	31,106
Total	1,551,101	282,269	369,825	222,498

April 1940

Belgium	.....	82,142	55,888	22,187
Denmark	.....	.....	.....	50
France	1,096,652	91,587	.....	104,644
Greece	.....	.....	14	2,799
Italy	372,368	.....	.....	30,775
Netherlands	.....	17	83,479	11,378
Norway	.....	10,967	60,803	339
Sweden	.....	32,470	.....	18,587
Total	1,469,020	217,183	200,184	190,759

In March Belgium imported 5,425 bbl. of residual fuel and Italy 52,631 bbl., a total of 58,056 bbl. There were no residual fuel-oil exports to Europe in April.

The same list of consumers took the following percentages of all United States petroleum exports in March: Crude oil, 38 per cent; motor fuel, 12 per cent; gas oil and distillate fuel, 16 per cent; residual fuel, 6 per cent, and lubricating oil 19 per cent.

In April the European countries now shut off took these percentages of the total petroleum exports from the United States: Crude oil, 35 per cent; motor fuel, 10 per cent; gas oil and distillate fuel, 10 per cent, and lubricating oil 17 per cent.

In the past 2 weeks there has been a reduction in the petroleum exports to Great Britain, both to Canada for transshipment and direct by trans-Atlantic shipping lanes. This situation is caused, so oil men believe, by reluctance of British authorities to accumulate more than needed petroleum supplies on the island until something more definite is learned of the strength of defense against German bombing attacks. British authorities realize that petroleum stocks in the path of invaders are almost as much a liability as they are an asset, particularly since Germany is believed to be struggling to finish the war as rapidly as possible because of an oil deficiency.

For the entire year of 1939 the European nations now shut off from United States petroleum supplies by some development of the war consumed 32 per cent of all crude exported, 26 per cent of motor fuel, 34 per cent of the gas oil, 17 per cent of the residual fuel oil and 37 per cent of the lubricating oil.

France and Italy combined imported 46,797 bbl. of United States crude oil daily during the first 4 months of 1940, approximately the same amount in May, but the June figure will not be more than half that total because shipments have been completely ended since the middle of the month. Even the rate of United States imports for the months in which shipments were made with comparative ease this year compare unfavorably with the average for 1939. In the past year Italy and France imported a daily average of 54,630 bbl. of crude alone from this country. France has been buying about 2,600 bbl. of motor fuel daily from the United States since the start of this year, compared to a 1939 average of 7,248 bbl. daily. Italy's purchases of motor fuel in this country are insignificant, amounting to less than 650 bbl. daily so far this year.

From January through April, Italy imported 2,197 bbl. daily of United States lubricating oil, compared to an average of 1,324 bbl. daily for the entire year of 1939. France jumped its imports of United States lubricating oil from a daily average of 1,317 bbl. in 1939 to 2,066 bbl. in the first 4 months of this year. There was a tanker loaded with a cargo of lubricating oil for Italy 2 weeks ago which is still in New York Harbor.

Under present circumstances, the United States petroleum industry has a daily average of 75,747 bbl. of oil daily, or a total of 27,647,655 bbl. a year previously going to other European countries that could be now diverted to Great Britain or elsewhere before anything like normal exports would be reached.

Tanker in Corpus Christi Harbor

Few Foreign Orders on Gulf

By NEIL WILLIAMS

HOUSTON, Tex., June 24.—With the export markets further disrupted as a result of rapid developments in the European war, and having on hand enormously excessive supplies of crude and refined products accumulated partly in anticipation of increased foreign demand that has not materialized, the Gulf Coast district is now depending on drastic adjustments domestically in the production, refining, and marketing to bring relief.

Italy and France have been the last major export outlets for oils shipped from the Gulf Coast, and with the closing of the Mediterranean Sea by British blockade due to Italy's entrance in the war, what markets the Gulf Coast had with the Balkan and other Mediterranean countries have been stopped. It is estimated that these latest developments have cost the Gulf Coast an additional loss of export markets amounting to more than 70,000 bbl. daily, of which about 40,000 bbl. comprises refined products and 30,000 bbl. crude oil.

Reflecting these losses of markets, export shipments of crude and refined products from Gulf Coast ports have declined since the war opened from a peak of more than 10,000,000 bbl. monthly to below 5,000,000 bbl. in April, the latest compilation available. Reports of exports during May indicate a considerably less volume of movement than during April, and it is probable exports from Gulf Coast ports during June will run below 2,000,000 bbl.

Monthly export movement from Gulf Coast ports during the first 4 months of this year was the lowest since early in 1937, and with indicated further reductions for June and July, these shipments may drop to the lowest level since 1935. As shown in an accompanying table, exports of crude and refined products totaled 5,104,591 bbl. In February these shipments dropped to 3,732,585 bbl., but increased in March to 5,491,308 bbl. Shipments in April were 4,902,621 bbl., or 5,330,441 bbl. less than total exports of 10,233,062 bbl. for last August, just prior to the war.

Export shipments for the first 4 months of this year totaled 19,231,105 bbl. compared with 30,857,096 bbl. for the same period of the preceding year, a decrease of 11,625,991 bbl. Of this decrease 7,122,389 bbl. was in refined products and 4,503,602 bbl. in crude oil. The accompanying tabulation of exports by months since August shows the curtailing effect the war has had on Gulf Coast export markets:

EXPORT SHIPMENTS BY MONTHS, GULF COAST PORTS, SINCE OPENING OF WAR

Month—	Crude oil (bbl.)	Refined products (bbl.)	Total shipments (bbl.)
August (1939)	4,385,189	5,847,873	10,233,062
September	3,093,743	3,690,209	6,783,952
October	2,986,502	3,769,096	6,755,598
November	1,882,820	3,220,650	5,103,470
December	2,179,577	3,465,716	5,645,293
January (1940)	2,141,114	2,963,477	5,104,591
February	1,487,945	2,244,640	3,732,585
March	1,917,898	3,573,410	5,491,308
April	1,918,382	2,984,239	4,902,621

As the situation now stands the Gulf Coast has lost about all its past regular export markets except what little business still is going to England and Canada, and a comparatively small volume to Spain and Portugal and certain South American countries.

Contrasting Opinions

How permanent will be the loss of export markets is a matter of conjecture. There are two marked lines of thought on the subject. One holds that these markets are permanently gone, at least for duration of the war and the reconstruction period. The other reasons that since matters have taken place so rapidly to cut off the existing markets almost overnight, the situation may change just as quickly and unexpectedly to open new markets. The latter school advances the theory that oil is a necessary commodity regardless of developments in those countries and that sooner or later the demand will arise, if not in one place, then in another.

The hope still is maintained that Britain, if able to withstand the impending German onslaught and the war is prolonged, may be forced to replenish and augment its supplies in increasing volume from Gulf Coast ports. This is in view of the likelihood that Britain will find it difficult to continue to provide an adequate and reliable supply from Iraq, Iran, Bahrein Island or the Dutch East Indies, due to uncertain and delayed transportation occasioned by Italy's participation in the war.

The Government of France is reported to have upwards of 600,000 bbl. of oil it bought and paid for early in the war in storage at various Gulf Coast terminals. What will be done with this oil remains a mystery, although there is a possibility it could be made available to Germany, if Germany could get it. Some have assumed that it may have been acquired by Britain.

France also had other purchases, which it was moving out on contract. These purchases handled by the Anglo-French buying commission are reported to have been canceled, although it generally is supposed that such commitments are to be taken over by the new buying commission representing the British Government only.

In the meantime stocks of both crude and refined products continue to pile up, holding a club over the market price structure. Movement of material from Gulf ports to the Atlantic seaboard was maintained fairly steadily throughout the winter, but this movement, with the decline of export shipments, has not been sufficient to prevent accumulation of stocks. It is reported that stocks at Gulf Coast storage points have been increasing at the rate of approximately 100,000 bbl. daily.

Crude reductions are expected to curtail the volume of crude pouring into Gulf Coast terminals and refineries sufficiently to more than offset the surplus now going into storage as a result of the loss of export markets. Reduction of crude runs to refinery stills, however, continues a major problem.

Independent refiners in the Corpus Christi district are the most seriously hurt by lack of export demand. Some of these companies have depended to a large extent on export business. Not having gone after the domestic outlets, supplied by the larger refiners in other Gulf Coast districts, the Corpus Christi group was the first to feel the decline in foreign trade. Due to accumulations of crude and refined products, storage conditions in that area have become acute. Several companies there have desired to cut runs to stills more than they have, or even shut down, but having established production connections it was not convenient to do so without danger of losing the connections permanently. One of the larger independent companies, however, has been shut down, except for brief periods of operations, for several months.

STATE CAPITALS...

OKLAHOMA

GOV. LEON C. PHILLIPS, chairman of the Interstate Oil Compact Commission, telegraphed President Roosevelt that he extended "the full facilities of the organization in the national defense."

"We have taken notice," Governor Phillips said, "of your reported statements to the press that the oil industry in the states of the compact should meet instantaneously any changes in the world oil situation.

"I agree most heartily with that statement."

Governor Phillips said the compacting states, through the commission, were "ready to take whatever action is required on short notice to produce all oil necessary for all elements of national defense, and produce it without waste."

OKLAHOMA'S ALLOWABLE PRODUCTION in July will remain unchanged under the 90-day order effective May 1, W. J. Armstrong, chief conservation officer, said Saturday. The order calls for 408,100 bbl. daily, but the federal Bureau of Mines Saturday estimated the Oklahoma demand at 403,900 bbl. daily in July.

Mr. Armstrong completed a canvass of crude purchasers Saturday and reported he found no buyer wanting to take less oil, while one or two still are wanting more oil, provided it can be connected along the company's pipe-line system. This condition has existed the last 2 months, Mr. Armstrong said.

SURVEY OF THE OIL AND GAS INDUSTRY, to complete the national industrial census, will be started in Oklahoma within the next few days, Fred Shaw, census supervisor in Oklahoma City, announced Saturday. This enumeration will be taken from two general groups: Producers of oil and gas wells, and contractors. Confidential reports will be made on each. Previously the marketing division of the industry was worked over in the general industrial enumeration.

Producers will be required to list the number of oil and gas wells completed, whether producers or dry, together with value of production and costs of operations. Considerable detail is required on number of employes, rate of pay, hours of work and other details applying to all types of labor. The producer also must list all properties, materials and other equipment owned, together with amounts paid to contractors of all types.

Contractors will be required to give detailed reports on employment and labor, together with listing of equipment, etc., owned and operated.

ARKANSAS

AT ITS BIMONTHLY STATE-WIDE hearing, the Arkansas Oil and Gas Commission heard statements from oil operators favoring continuation of allocations in controlled fields, along the same general levels that prevailed in the past 2 months. Stocks of Arkansas crude were reported to be less than a year ago. Standard Oil Co. of Louisiana, major purchaser in the state, announced through its representative that crude oil takings might have to be reduced 2,000 bbl. in view of the current situation, but the reduction of allowables on this basis was protested by most operators who considered it a matter of policy rather than conservation.

Following the hearing the commission issued orders giving controlled fields a daily allowable of 46,310 bbl., for July and August, thus remaining basically the same as in the 2 preceding months.

The commission also issued an order allowing a tolerance of 1 day's allowable in the current month's production for all pools in order to facilitate pipeline companies' operations. This tolerance will be made up in the ensuing month.

The commission sanctioned the formation of an operators' committee to make an operation study of the Schuler field, Jones sand reservoir, and will give consideration to the recommendations of this committee.

ARKANSAS OIL AND GAS COMMISSION is compiling a detailed survey of oil and gas resources of the state to determine their availability for national-defense use, to be submitted to the governor August 1, 1940. The survey will include data pertaining to the following topics: oil field locations; production; characteristics of oil produced; transportation from fields; main trunk lines and storage facilities in state; refineries; gasoline plants and gas fields.

A NEW OPERATORS' COMMITTEE, sanctioned by the Arkansas Oil and Gas Commission, has been formed to study operations in the Jones sand reservoir of the Schuler field. Members named to the committee include: A. M. Crowell, director, Arkansas Oil and Gas Commission; C. M. Oden, Phillips Petroleum Co.; Frank Richardson, Lion Oil Refining Co.; C. D. Lange, Marine Oil Co.; Don Montgomery, J. K. Mahoney and others; Nolan Rushing, Alice Sydney Oil Co.; and D. M. Love. E. M. Jones.

MICHIGAN

PRORATION OF CRUDE-OIL production in four of the five limited Michigan fields may be abandoned by the end of the summer, according to an announcement by F. R. Frye, state Conservation Department engineer. He said the move, if made, would result from a decline in potential output of the four pools to the extent that proration no longer would be necessary.

Plans now in progress provide for discontinuance of the allowable withdrawal limits in the South Overisel, New Salem, Walker and Freeman pools. Proration, however, would be continued in the 20-acre Redding field.

TEXAS

ALLOWABLE PRODUCTION in Texas in the last 10 days of June was cut about 300,000 bbl. per day by the Railroad Commission to meet actual market demand for Texas crude oil. A sudden cessation of foreign demand had brought about a condition, which, if production had been permitted to go on on the basis of conditions on May 24, would have resulted in a large addition to crude stocks already too high. Companies which had purchased crude far in excess of their immediate removal facilities and were banking on France needing oil for at least several months more of war, were caught in the full tide of war-canceled purchasing contracts. This was true of refiners along the Gulf Coast all the way from Port Arthur to Corpus Christi.

A detailed account of the action of the Railroad Commission will be found on Page 30.

A COMPLETE SURVEY for national-defense purposes of Texas' oil and gas industry and its resources was begun on June 21 by Railroad Commission engineers.

Expenditure of $14,000 for the inventory, suggested by Commissioner Ernest O. Thompson, was approved by the limitations payment board composed of the governor, attorney general and treasurer.

The survey, complete with detailed maps, will spot every oil and gas well in the state, trace pipe lines and rail facilities, locate refineries and check their capacities and determine the chemical possibilities of oils and gases.

John Taylor, director of production in the Oil and Gas Division of the commission, said a staff of 40, including 30 engineers, would be instructed to complete the task within 60 days.

CALIFORNIA

CENTRAL COMMITTEE of California Oil Producers, after a study of prevailing conditions, and expectancies during the next months, reduced California's crude-oil allotment 5,000 bbl. per day for July, or to 587,000 bbl. daily. Allowable maximum for individual wells was reduced from 172 bbl. daily to 168 bbl. daily. Preliminary estimates indicated that 109 wells would be completed in July and require about 12,000 bbl. of production. Quota provisions for these wells were obtained by applying for the reduction ordered in top allowables and a corresponding reduction in quotas of other wells already on production. Actual production during June was higher than in May.

LOUISIANA

LOUISIANA DEPARTMENT OF CONSERVATION has announced that state oil allowables will be set every 2 months, instead of monthly as in the past. Each 2-month schedule will be preceded by a public state-wide hearing, and no special orders will be issued as in the past. The move is one of economy.

The state is now showing willingness to conform to Bureau of Mines estimates and to the policy followed in other producing states of preventing surface waste through oversupply of crude in storage. Allowable for July and August will be about the same as in June.

LOUISIANA'S DAILY OIL ALLOWABLE for July was set at 280,371 bbl., an increase of 205 bbl. over June. South Louisiana fields were allowed 220,011 bbl., 742 bbl. over the June allowable of 219,269. North Louisiana fields were cut to 60,360 bbl., 537 bbl. less than June's allowable. The July allowables were 13,000 bbl. below the May proration order.

ALTHOUGH NO CHANCES OF PASSAGE are granted it, a revolutionary taxation plan has been introduced to committee at the Louisiana Legislature. The plan provides for lightening the tax load on refineries, and shifting it to the producing division of the oil industry. This is accomplished by three bills, taking the occupation license off Louisiana refineries, imposing a license tax on producers and reducing by 50 per cent the franchise or corporation tax now levied on capital used in oil refining.

This move was prompted by the fact that Texas refiners are processing much Louisiana crude. In an effort to promote the refining industry in the state, sponsors of the bills hope to reduce the Louisiana refiner's tax burden to compare with the lesser levies on refiners in Texas. The bills are not scheduled for action this session, but will be studied in committee with the object of possible future action.

Numerous bills concerning taxation, labor and conservation are in committee at the legislature, and the latter subject, covered in a comprehensive new conservation bill providing for state enforcement and cooperation with operators in developing recycling of high-pressure gas-condensate reserves, may see action soon.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Second Half

Confused by conditions both here and abroad, economists in many industries are contending that no projections of trends in their activities can extend for more than a few weeks.

Fortunately, the oil industry does not occupy this position. Developments in foreign markets are uncertain, but these outlets represent less than 15 per cent of the total petroleum market of this country. The remaining 85 per cent, going to domestic buyers, can be accurately gaged.

An understanding of what happened the first 6 months will aid in estimating the remainder. The domestic demands for the principal refined products increased from 6 per cent to more than 20 per cent. The actual consumption of these products exceeded the totals of any previous half year in the history of the industry.

Exports, due entirely to war developments, have decreased, with the exception of lubricating oil and petroleum wax. The increase in domestic consumption was far greater than the decline in exports, so that the total demand for crude oil and finished products established a new half-year record.

No one knows what the exports over the remainder of the year will be. During the past month they have dropped to a minimum through the cutting off of important European outlets.

This situation may shift in the immediate future, or it may continue for an indefinite period. Conceivably, over the next few months there could be Old World changes in production, refining operations, and in the movement of products which would bring large orders to this country and other parts of the Western Hemisphere.

Developments since last fall, however, show that it is safer to discount the war and concentrate attention on the domestic market.

The domestic outlook for finished products is wholly favorable. Motor-vehicle sales are running far ahead of last year's. Every use of petroleum products for internal-combustion engines is expanding rapidly.

An upturn in industrial activity is bringing enlarged demands for heavy fuel oils. A record consumption of furnace oils and burning oils appeared assured for the coming winter. The demand for these heavier fractions of crude oil is expanding more rapidly than gasoline and producers and refiners might well give consideration as to how these outlets can be balanced to the best interests of all concerned.

The percentage gains for the various products probably will be less than for the half year now closing, but the increases are certain to be much greater than any possible decline in export movement.

This takes care of demand. What happens to the supply is entirely the responsibility of producers, refiners, and the state conservation bodies. Suppliers insisted upon overproducing the highly satisfactory requirements of the first 6 months. Actual production of crude oil over the half year which ends Sunday will be approximately 40 million barrels greater than the Bureau of Mines month-to-month estimates of demand.

This explains the increase in crude stocks and the excessive gasoline inventories which have brought unwanted and wholly unjustified price trends. If those responsible insist upon the same operating policies over the second half of the year, expanded domestic markets will simply mean decreased earnings.

As usual, consumption in the oil business will take care of itself. Operators, if they have learned from the mistakes of the past, will take immediate steps to bring supplies in balance with this demand giving consideration to the reduction of excess inventories.

Domestic Gasoline Demand Is Six Per Cent Over Year Ago

THE daily average supply of domestic crude oil estimated by the Bureau of Mines to meet the market demand in July 1940 is 3,628,400 bbl. This is 8,100 bbl. more than the estimated demand for June but 23,600 bbl. less than the actual demand for July 1939. The low figure for July 1940 is attributable chiefly to the decline in exports.

Daily average crude-oil production and runs to stills during the 4 weeks, May 5 to June 1, were 3,787,000 and 3,629,000 bbl., respectively. During this period domestic crude stocks increased an average of 103,000 bbl. daily, indicating a demand of 3,684,000 bbl. per day, compared with 3,601,000 bbl. estimated by the bureau. However, the gasoline stock decrease was less than half that forecast by the bureau.

The increase in the domestic demand for motor fuel is being offset by the severe decline in exports so that the total demand in the third quarter may be less than 3 per cent above last year. This situation, coupled with the high inventories of gasoline, normally would indicate a curtailment of runs. However, this objective has not been attained because of the relatively large demand for light fuel oils and the necessity of building up depleted stocks. To correct this situation low gasoline yields and high distillate yields are indicated as essential.

TABLE 1—ESTIMATED DAILY AVERAGE CRUDE-OIL DEMAND BY STATES

(In barrels)

(As no changes in crude-oil stocks are involved in these estimates, they represent demand rather than production).

State—	Forecast July 1940	Forecast June 1940	Actual July 1939
Texas	1,339,400	1,344,600	1,448,000
California	593,900	593,700	616,000
Oklahoma	403,900	408,600	427,000
Illinois	402,300	395,600	261,000
Louisiana	278,100	274,700	269,000
Kansas	159,400	159,000	182,000
New Mexico	106,100	106,700	127,000
Wyoming	80,600	73,000	67,000
Arkansas	67,400	66,700	58,000
Michigan	61,600	62,000	73,000
Pennsylvania	47,900	49,400	47,000
Montana	18,100	18,300	18,000
Kentucky	14,200	15,000	13,000
New York	14,000	14,000	10,000
West Virginia	10,000	11,000	11,000
Mississippi	9,700	7,000	.....
Indiana	9,000	8,000	4,000
Ohio	8,000	9,000	17,000
Colorado	4,800	4,000	4,000
Total	3,628,400	3,620,300	3,652,000

For August and September, no substantial increase in crude runs to stills over July is anticipated. The decline in crude exports is offsetting the increase in runs and the total demand for domestic crude oil may be less than last year.

The estimated domestic demand for motor fuel is 54,800,000 bbl., a gain of 8.5 per cent over the demand for July 1939. This indicated increase is comparatively high because last year's demand was abnormally low; actually, the general trend in domestic demand for motor fuel is only about 6 per cent higher than a year ago.

Forecasts by the principal exporters of motor fuel indicate that foreign shipments of motor fuel will be very low for July. The bureau has estimated the total for that month at 2,000,000 bbl., which is 400,000 bbl. less than the June estimate and 1,585,000 bbl. less than the actual exports in July 1939.

Crude oil demand by states.—The breakdown of the total estimated daily demand for domestic crude oil of 3,628,400 bbl. gives the following crude requirements by states of origin. As these requirements may be supplied either from stocks or from new production, contemplated withdrawals from crude-oil stocks must be deducted from the bureau's estimate of demand to determine the amount of new crude required. These estimates are not recommendations for production but represent the projection of actual market trends by states.

Stocks of finished and unfinished gasoline on April 30 were 103,563,000 bbl. Statistics of the American Petroleum Institute show a decrease of only 1,940,000 bbl. during May, which would make these stocks approximately 101,600,000 bbl. as of May 31, far above the level of a year ago. If the industry continues to run sufficient crude to supply the demand for other oils, adequate reduction in gasoline stocks can not be made at the present yields. The bureau estimates a possible reduction of 5,600,000 bbl. in finished gasoline stocks in July.

Benzol and direct sales of natural gasoline are estimated as 1,100,000 bbl., making refinery production of gasoline 50,100,000 bbl. This is distributed among the various districts as follows (thousands of barrels): East Coast, 6,720; Appalachian, 1,930; Indiana-Illinois, 10,050; Oklahoma, 2,810; Kansas-Missouri, 2,630; Inland Texas, 3,630; Texas Gulf Coast, 12,400; Louisiana Gulf Coast, 1,500; Inland Louisiana-Arkansas, 890; Rocky Mountain, 1,350; California, 6,190.

Runs to stills.—Natural gasoline to be blended at refineries is estimated as 5.55 per cent of the total refinery gasoline production, or 2,780,000 bbl. The yield of straight-run and cracked gasoline, in order to provide for the demand for other oils, is estimated at only 43.1 per cent. The application of this yield to the production of 47,320,000 bbl. of gasoline gives crude runs of 109,780,000 bbl., or 3,541,300 bbl. daily. Foreign crude runs are estimated as 3,200,000 bbl.

Exports, fuel, and losses.—Canada, France, and Japan have been the principal foreign markets for United States crude oil. Exports to France have averaged more than a million barrels monthly for the first 4 months of this year. Recent war developments not only will curtail this market but may force oil, formerly marketed in France from other countries, into competition with United States' oil in its remaining export markets. The bureau estimates that crude exports in July will be 3,700,000 bbl., or 900,000 bbl. less than the June forecast and 3,600,000 bbl. less than the actual exports for July 1939.

The estimate for crude oil to be used for fuel and losses for July is 2,200,000 bbl.

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Triple Damage Suits Are Filed Following Madison Decision

MADISON, Wis., June 22.—Twelve major oil companies were named defendants today in 11 civil suits asking damages of $945,480.

The plaintiffs, who are invoking the triple-damage provision of the Sherman Act, following the Madison case, allege the companies engaged in a "combination, agreement and conspiracy in restraint of trade and commerce."

Those who filed suit and the damages asked were:

Jobbers—Wilson Oil Products Co., Minneapolis,$435,840; Hi Test Gas & Oil Co., Lidgerwoon, N. D., $19,200; Sinaiko Brothers Coal & Oil Co., Madison, $31,680; Monark Petroleum Corp., Minneapolis, $72,300; Three Star Oil Co., Breckenridge, Minn., $94,800.

The consumers, all transportation firms, were:

Watson Transportation Co., Omaha, $120,000; Hennepin Transportation Co., Minneapolis, $12,000; Cushman Motor Delivery Co., Chicago, $30,000; Werner Transportation Co., Chicago, $30,660; Raymond Brothers Motor Transportation Co., St. Cloud, Minn., $60,000, and Blue & White Cab Co., St. Paul, $39,000.

The defendant oil companies are:

Socony-Vacuum Oil Co., Inc., Wadhams Oil Co., Empire Oil & Refining Co., Continental Oil Co., Pure Oil Co., Shell Petroleum Corp., Phillips Petroleum Co., Skelly Oil Co., Globe Oil & Refining Co. (Oklahoma), Globe Oil & Refining Co. (Illinois), Sinclair Refining Co., Mid-Continent Petroleum Corp.

New Antitrust Oil Suit Due Within 10 Days

WASHINGTON, D. C., June 24.—One government department which is making no changes in its policies as a result of the national-defense program is the Department of Justice. Officials of the antitrust division insist that they are going ahead as rapidly as possible with the preparation of a new suit against major oil companies. Prominent oil men have been attempting to convince government officials that such a suit would disrupt the efficiency of the oil industry and would impair its ability to cooperate with the government in the national-defense program, but from all indications they have made little or no headway.

A spokesman for the autitrust division declared today that the oil suit would be filed probably within a week or 10 days. He declined to give any details except to confirm earlier word that the suit will be a big one, will be nation-wide in scope, will seek to revise distribution methods, and may include a demand for breaking up of integrated companies through divorcement of some branches of their operation. It will be a civil rather than a criminal case, and will be filed in some eastern federal court which can claim jurisdiction over all major companies involved.

Depletion Tax Reduction Amendment Rejected

WASHINGTON, D. C.—The conferees of the Senate and House deleted amendments of Senators LaFollette and Connally to add a war-profits tax clause in the impending revenue act of 1940. The amendment to lower the oil-depletion tax allowance from 27½ per cent to 13¾ per cent was also stricken out.

THE MARKETS*

CRUDE OIL: Illinois fields passed the 500,000-bbl. mark in average daily production last week, the Centralia field having closely approached 100,000 bbl. a day in production. The increase came from unusually large flush wells in the Clinton County side of the field. Total production in the United States was 3,845,387 bbl. per day, an increase of 26,389 bbl. per day over the previous week's total.

REFINERY: Although consumption of gasoline is estimated to be more than 8 per cent higher than it was in 1939, and buying is brisk, prices fail to reflect the higher demand. Many refiners look for a temporary easing in both contract and open-market movement after the close of June. Increasing activity in industrial operations is imparting strength to the heavy fuels. Kerosene and tractor fuels experienced further softness. Mid-Continent lubricating oils lost another cent, and light fuels in that territory were down.

TANK-WAGON AND POSTED DEALER: Socony-Vacuum reduced consumer tank-car and dealer tank-wagon gasoline prices generally throughout New York and New England except where prices already were depressed. Standard of Kentucky made a general revision of gasoline prices except in Kentucky, in most cases downward. Continental reduced tank-wagon and dealer prices of gasoline at several Rocky Mountain points.

FINANCIAL: Losses outnumbered gains among the oil issues, which, like the rest of the stock market, displayed irregularity. Average of 30 representative stocks for week ended June 22: High, 21.77; low, 20.54; close, 21.07. Week ended June 15: High, 21.91 low, 19.52; close, 21.42.

*Detailed information in market section.

DEATHS

WALLACE SAUNDERS, 60, formerly well known as a Canadian driller in foreign fields, died at London, Ont.

HUGH HAROLD FAIR, electrical engineer with the International Petroleum Co. in Peru, died in a hospital at Talara following injuries received in an airplane accident.

ARTHUR T. DOREMUS, 64, assistant secretary of Socony-Vacuum Oil Co., Inc., until he retired in 1936, died of a heart ailment June 18 at his home in South Orange, N. J. He joined the Standard Oil Co. in 1896.

Wiess Sounds Warning At Permian Meeting

ODESSA, Tex., June 22.—Harry C. Wiess, Houston, president of the Humble Oil & Refining Co., sounded a note of warning to the oil industry and to the nation as a whole here last night when he delivered the principal address at the banquet in connection with the annual convention of the Permian Basin Association. Discussing the crisis in world affairs, Mr. Wiess said this country must not make the mistake committed by others, that of failing to recognize the menace of power-mad forces overseas and preparing to meet it.

Prospects that there will be no general change during the next several years in the present trend toward lower production per well necessitate the application of careful and sound development and production practices to insure profitable operations for the oil industry. Mr. Wiess said. He stressed the importance of wider spacing as a means of obtaining greater returns per well.

J. L. Greene, president of the Permian Basin Association for the past year

West Texas already has about 10,000 producing wells drilled on 10, 20 and 40-acre tracts, and still has 156,000 proved acres which remain to be developed, Mr. Wiess said. This acreage would require about 4,000 wells to develop completely the acreage on 40-acre spacing, and about twice that number on 20-acre spacing, or an increase of from 40 to 80 per cent in the number of wells to be drilled and investment in West Texas. At the present rate of development, 8,000 wells will be added to West Texas during the next 5 years, he added.

For an area such as West Texas, which is carrying on an active drilling program and investing large amounts in new wells, it is essential to consider carefully the circumstances under which additional investments should be made, Mr. Wiess cautioned. "The rate at which we carry on developments of West Texas' reserves will influence not only the return on our investment but also the profitableness of our existing investment in the area."

Critical Period

There is nothing to indicate any general increase in production per well in the United States can be expected during the next several years, Mr. Wiess said. The whole world is passing through an exceedingly critical period, and the oil industry can expect to share in the problems. This necessitates a conservative attitude on the part of the industry and a leaning toward the safe side to weather the storms. He expressed confidence that the industry had learned its lessons from experience and that it would pursue a sound course now and in the future.

C. E. Buchner, Tulsa, executive manager of the Independent Petroleum Association of America, said wars are won by organization and that such bodies as the Permian Basin Association are important in effecting needed unity.

Elliott Roosevelt said this country must be calm, alert, and ready.

Hamilton McRae, Midland, Tex., lawyer, was elected president of the association, which closed its 2-day convention today. Vice presidents chosen to serve with him for the ensuing year are C. C. Thompson, Colorado City; George W. Elliott, Odessa; S. E. Cone, Lubbock, and C. W. Meadows, San Angelo. Mr. Thompson and Mr. Elliott were relected. Lubbock was named as the convention city for 1941.

A three-point program adopted covers taxation, legislation, and proration. To develop its attitude on taxation the association voted to set up a central tax committee composed of two representatives from each of the four regions, north, south, east, and west. It will be the duty of this committee to consult tax experts representing oil. railroads, real estate, and utility companies in the basin in working out an equitable and economical tax program. In order to meet rising taxes growing out of the national-defense program, which the association wholeheartedly approves, a reduction in local and state taxes will be demanded.

To carry out its legislative program, the association created a legislative committee composed of directors from each member town of the organization to guard its interests before legislative bodies.

Proration Committee

A committee of five, to be named later, was authorized to handle proration matters for the association. This committee is to gather information for presentation before regulatory bodies. It also will be empowered to seek equitable distribution of allowables between states and districts and pools in the Permian basin.

It was recommended that, when conditions warrant, the association establish a statistical personnel for compiling data relating to proration problems.

An executive committee chosen consists of J. L. Greene, of Midland, retiring president; Frank Kelley, Colorado City; Ben Lefever and Cliff D. Wiley, Big Spring; William R. Edwards, McCamey; E. L. Farmer, Odessa; Tom Duggan, Jr., Lubbock; C. M. Armstrong, Seagraves; Henry Brice, Snyder; Carl Rountree, Lamesa, and Deen Nowlin, Tahoka.

Wilburn Page, executive secretary, was named publicity director to conduct an education campaign.

The boundaries of the Permian Basin Association were defined on the north by the territory served by the Panhandle Association, on the east by the West Central Texas Oil and Gas Association district, on the south and west by the boundaries of the state.

The principal speaker at the closing session was George C. Gibbons of Dallas, executive vice president of the Texas Mid-Continent Oil and Gas Association. He called attention to the big increase in population in the area during the past 20 years as a result of oil discoveries and development.

He declared that, according to the area's own figures, the oil industries employ 100,000 persons in the basin, and that the oil development has played a great part in developing the thriving cities of Midland, Odessa, Lubbock, and Big Spring. These, he said, were struggling towns 20 years ago.

Harry C. Wiess, president of Humble Oil & Refining Co., Houston, Tex., addressing the P.B.A. banquet

The association's by-laws were changed to include three directors from each member town, regardless of membership. These directors are to be named by civic bodies in their respective towns. It also was voted to change the fiscal year to correspond with the calendar year. It heretofore has ended on May 31.

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Latin-American Trade Cartel To Offset War Losses

WASHINGTON, D. C., June 24.—Vigorous steps to offset the loss of normal European markets for Caribbean oil and other export products of Latin-American nations are being taken by the administration. Plans are being perfected for a gigantic international cartel, or trading corporation, to include all 21 American republics and possibly also Canada. The plan will be presented to Congress in the near future and all Latin-American countries have been invited to assemble soon, probably in Havana, to pass on the program. Only broad outlines of the plan have been disclosed so far, but it contemplates an organization, financed by the United States, to purchase or act as broker for exportable surpluses of all American countries.

The plan is described as a temporary emergency measure, but it is well known that the chief purpose is to prevent Germany from obtaining an economic stranglehold on the Americas through barter arrangements, use of blocked currency, subsidies, and similar methods. Officials declare there is no thought that South American products might be brought into this country in greater quantities than at present to the detriment of American producers, but it may be necessary for the corporation to dump or store large stocks in order to prevent them from going to Germany on unfavorable terms. Most of the discussion so far has concerned wheat and meat products, but if the plan is put into operation it will undoubtedly have to deal at once with petroleum from Venezuela, Colombia, and Mexico.

Independents Join Opposition To Pipe Line Bill

By W. V. HOWARD

INDEPENDENT operators, major companies, and state officials are registering increased opposition to the amendments to the Interstate Commerce Act proposed by Senator Johnson of Colorado as the implications of these amendments become more thoroughly understood.

The bill, S. 3753, proposes to add to Part 1 of the Interstate Commerce Act three paragraphs which place pipe-line companies under the same restrictions with regard to new construction as the railroads. The first paragraph states, in effect, that no pipe-line company shall construct any new line or extend existing lines without a certificate from the Interstate Commerce Commission that "present or future public convenience and necessity require or will require the construction or operation, or construction and operation, of such additional or extended pipe line."

The second paragraph deals with applications for these certificates and requires the commission to notify the governors of all states involved and to publish notice of the application in a newspaper circulating in each county in or through which said pipe line is proposed to be constructed or operated for a period of three consecutive weeks. Provision is also made for hearings. The third paragraph gives the commission the right to approve or disallow the application and provides penalties for all who are involved in the construction or operation of an unauthorized line.

It would appear that where pipe-line companies wish to make new connections to a lease they would have to apply for a permit and wait at least 3 weeks or a month to make the connection, provided no one wished to be heard on the subject. It would require a minimum delay of a month before oil could be produced from any lease in an extension, regardless of the market demand for that oil. It would, moreover, place production from all newly discovered fields and extensions under the jurisdiction of the Interstate Commerce Commission unless there happens to be a railroad line through the new discovery. Operators could, of course, have their oil trucked out to a point on the pipe line where there were facilities for handling it, which would require additional tankage and would greatly reduce the operator's profits as well as the return to the royalty owner.

Production Control Implied

Jack Blalock, Independent Petroleum Association of Texas, presented a hypothetical case before the subcommittee holding hearings on the bill in which he showed that in a certain field which should produce 30,000 bbl. for efficient operation and without waste, the commission might find public convenience and necessity for a pipe line with only 15,000-bbl. capacity. The field would then produce 30,000 bbl., of which the pipe-line company would take half, leaving the other operators to get their oil out in whatever way they could. This would result, he said, in the "complete, speedy, and absolute elimination of every independent oil producer in the various states."

Viewed in this way, the measure places control of the output of oil fields in the hands of a governmental agency and one which has no present facilities for regulating anything but transportation. It reestablishes with much greater opportunities for monopolistic control a system of pipeline proration which all state regulatory bodies have attempted to break down. It was pointed out by Theodore Gore, vice president of the Kansas Independent Oil and Gas Association, representing that association and Governor Ratner, that the bill would result in a conflict of authority between the commission and the State of Kansas on the amount of oil that could be produced from fields within the state.

Independent producers have joined the majors in expressing opposition to the Johnson bill. Passage of this bill would not greatly benefit its principal proponents—the railroads, and would seriously affect the efficient operation of oil properties and the oil-transportation system. It would tend to raise prices and hamper preparations for national defense, by causing delays in extending transportation facilities in the face of an expanding demand for oil.

The governors of the oil states are also expressing their opposition to this bill which would result in a conflict of jurisdiction between the states and the Interstate Commerce Commission.

The provisions of the bill and some of its implications are discussed in this article. Although directed primarily against gasoline pipe lines, its provisions would fall most heavily on the crude-oil lines.

A telegram from Governor Phillips of Oklahoma, read by W. J. Holloway, attorney of Oklahoma City, stated, among other things, that the petroleum industry pays one-half of the taxes in Oklahoma. Thus this regulation would give the commission power indirectly to regulate state receipts and expenditures.

R. V. Fletcher, vice president and general counsel of the Association of American Railroads, pointed out that railroads cannot abandon a line without the consent of the Interstate Commerce Commission and said that possibly a section on abandonment should be added to this bill.

Joseph P. Kerr, chairman of the Southern Freight Association, stated that pipe-line rates and rail rates are identical and that there was no reduction in the price of gasoline to the consumer after the beginning of pipe-line service in midwestern cities. This refers to gasoline pipe lines as elsewhere in the hearing it was shown that crude-oil pipe-line rates were 35 per cent of rail rates.

In answer to Mr. Kerr, John D. Gill, Atlantic Refining Co., pointed out that prices of petroleum products have declined 29.8 per cent with respect to other commodity prices. He also showed that the difference in service-station prices between eastern points and Tulsa varies from —6.6 to 14.2 per cent, whereas the increase in prices in those cities over Tulsa prices after the addition of rail freight rates would be from 14.3 to 46.6 per cent.

T. P. McGrath, counsel for the Railroad Labor Executive Committee, testified that the pipe lines made a profit of $80,000,000, whereas the railroads with a vastly greater investment lost $126,000,000. Following a query by Senator Johnson as to whether the railroads were not glad that the gasoline pipe-line rates conform to the rail rates, Mr. McGrath admitted that if gasoline pipe-line rates were on a cost basis the rails could not compete and would lose all of the business.

Effect on Industry

If this bill becomes law, fields without adequate pipe-line facilities would be developed at a time when operators are required to sell their flush production at lower than posted prices. The pipe-line companies would be hampered in their construction of lines calculated to maintain a steady flow of oil from the field to the refinery and to take care of the continuous expansion of the demand for oil. As more oil is restricted from pipe-line connections, prices paid by the public will rise since there is no other system of land transportation of petroleum which is at all comparable in efficiency and economy to pipe-line transportation. At a time when all minds are concentrated on national defense, the task of organizing that defense insofar as its most vital commodity is concerned would be greatly increased by the fact that at least a month must elapse before any improvement could be made in transportation of that commodity. Actually, even the looping of pipe lines which so materially aided the Government during the last war could be delayed by these amendments, if adopted, even if the commission wished to cut red tape in order to permit the Government to secure additional supplies of oil.

Sen. Clyde M. Reed of Kansas, a member of the subcommittee, said that he would want to put in the bill a statement that gathering lines need not get certificates, but that trunk lines be required to get them. This would remove some of the objections to the measure, although in the opinion of opponents of the bill it could be used to compel gathering systems to connect with railroads. J. C. Hunter, president of the Mid-Continent Oil and Gas Association, and Theodore Gore stated that they could not distinguish clearly between gathering lines and trunk lines. As an example, the Stanolind line from the Bemis pool to Washington, Kans., would be considered a trunk line, except for that portion within the fields. The line lies entirely within the State of Kansas but connects with the Stanolind trunk line from Wyoming to eastern Missouri. Without this line it would be useless to construct the gathering system in the Bemis area, which would remain without adequate outlet for its oil until the objections of all of the competing transportation systems had been heard and the decision rendered by the commission. Despite any possible objections to this line, existing facilities are unable to handle the oil from the Bemis area which is currently running some 35 per cent below its allowable production.

Dr. R. E. Wilson to Be Adviser On Technical Oil Problems

By HENRY D. RALPH

WASHINGTON, D. C., June 24.—War developments and national-defense plans touched the oil industry in many ways during the past week. Rushing through its program in order to recess for the Republican National Convention, Congress enacted the billion-dollar tax bill and a group of other measures to expedite defense, the National Defense Advisory Commission recognized the importance of oil in its program, the administration moved to prevent a victorious Germany from gaining control of Latin-American oil properties, and Washington officials were closely watching the rate of oil production in the face of lost European markets.

Dr. Robert E. Wilson, president of the Pan American Petroleum & Transport Co., American Oil Co., and subsidiaries, has been appointed as a consultant on petroleum products to the National Defense Advisory Commission. He will serve on the staff of Edward R. Stettinius, Jr., member in charge of raw materials. He will give only part time to the commission and, for the present at least, his main job will be to advise on technical problems relating to aviation gasoline and lubricants in connection with the design of airplane motors. First reports that Dr. Wilson would supervise the entire oil industry as it relates to the defense program were due to the fact that the commission refused to confirm news of Dr. Wilson's appointment or to describe his duties until several days after he had actually been on the job in Washington. It is quite likely, however, that Dr. Wilson's duties will be expanded as the petroleum industry assumes a greater importance in the defense picture, but at present the Advisory Commission is concerned chiefly with getting defense material into mass production and is giving little attention to supplies for servicing and maintaining the armed forces.

Dr. Wilson was born in Beaver Falls, Pa., in 1893. He received the degree of Ph.B. from the College of Wooster in 1914, B.S. from the Massachusetts Institute of Technology in 1916, and Sc.D. from Wooster in 1931. At this year's commencement of the Polytechnic Institute of Brooklyn (New York) the degree of doctor of engineering was conferred upon him. Early this year he received the Chemical Industry Medal of the Society of Chemical Industry, awarded annually for valuable application of chemical research to industry. He has made a special study of the utilization of refinery gases.

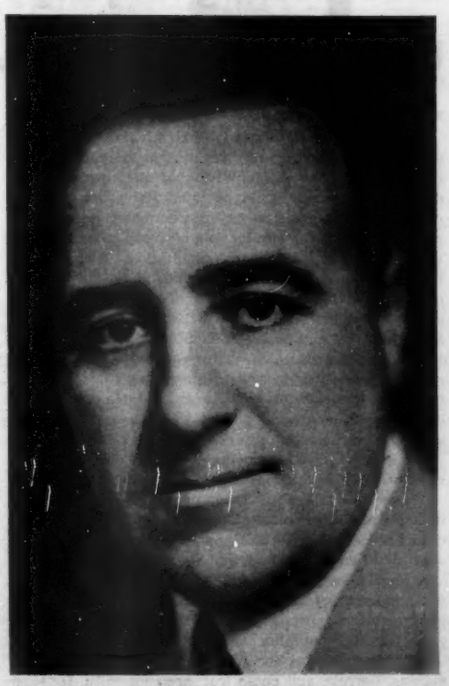
In 1922 Dr. Wilson entered the oil industry as assistant director of research for the Standard Oil Co. of Indiana. Seven years later he was made assistant to the vice president in charge of manufacturing. After that he was made director and then vice president in charge of research and development. In 1935 he was made vice chairman of the Pan American Petroleum & Transport Co., largest subsidiary of the Standard of Indiana, later becoming president.

Tax Bill

CONGRESS completed work on the billion-dollar defense tax bill, leaving the petroleum and general business taxes in the form in which the bill passed the House. On July 1 the federal tax on production of gasoline will be 1½ cents a gallon, the tax on transportation of oil by pipe line will be 4½ per cent, and the tax on production of lubricating oils will be 4½ cents per gallon. There is no change in the basic law affecting any of these taxes other than the increase in the rates. There is no floor-stocks tax on petroleum products, so that gasoline in the hands of jobbers on which the tax has been paid under the old rate will not be affected. There is a provision in the permanent internal-revenue code prohibiting a dealer from increasing the price of a product and citing federal taxes as the reason for the increase when the tax was not applied to the dealer or his stocks or when the tax was not as great as represented. Increased corporation taxes in general voted by the House were accepted by the Senate and are a part of the new law.

In final action on the bill, conferees refused to accept two amendments imposed by the Senate after brief debate, the La Follette amendment for a schedule of corporation-income surtaxes and the Connally amendment for a wartime system of excess-profits taxes and war-finance control. These amendments were eliminated on the promise that the House committee on ways and means will study these and other revenue matters during the summer and fall, so it is probable that both these measures will come before Congress again in the near future. The Connally amendment, previously pending as a separate bill (S. 4141), is a complicated measure of more than 300 pages drafted with the approval of the Treasury Department and containing permanent revisions in a great many provisions of the tax laws and several special provisions to go into effect in time of war, including a section giving the president complete control over commodity prices.

The Patman chain-store tax bill was definitely killed for the rest of this Congress when the subcommittee of the House ways and means committee voted against reporting the measure to the full committee. The subcommittee held 6 weeks of hearings during the spring at which advocates of the bill proposed amendments to include prohibitive taxes on chain filling stations. While making no formal report, the subcommittee expressed the view that if the federal Government is to adopt the policy of regulating chain-store growth it should do so by direct regulatory law rather than through the device of taxation. Opponents of chain merchandising promised to continue the drive for antichain legislation in the next Congress.



DR. R. E. WILSON

Proration

WASHINGTON officials are closely watching the action of state conservation commissions enforcing proration laws in the light of national-defense requirements and the loss of European export markets. With the entry of Italy into the war, the closing of the Mediterranean and the collapse of France, it appears that the entire European market is lost to Western Hemisphere exporters except such supplies as England may take, presumably from Venezuela, to supplement whatever the British may be able to bring around Africa from the Near East. Not only is the United States export market in peril, but oil from the Caribbean fields is without its normal export outlets and much of this may back up against the United States domestic market.

The way in which the oil-producing states handle the present production problem is viewed in Washington as the ultimate test of state regulation. If the oil states fail to keep production in line with current demands and to make an equitable allocation of production among themselves—and government officials think they will fail—the result will be increased demand for enactment of the pending Cole federal-control bill. On the other hand, if the state bodies admit that they are curtailing production to prevent a price decrease they run the risk of being charged with violation of the antitrust laws. The administration, therefore, feels that the present situation is playing into its hands and that enactment of the Cole bill in the near future is inevitable. Some of them, however, feel that the Cole bill does not go far enough for purposes of national defense, and that in any real emergency the federal Government would require authority to regulate refining and transportation as well as crude production.

Pennsylvania Grade Outlook Promising

(Continued from Page 31)

taken, the Pennsylvania refiner will be most advantageously situated. He cautioned the use of additives, since one property of the oil may be improved while another is impaired, adding that specifications are not a true measure of the lubricating value of an oil.

Dr. S. T. Yuster, director of water-flooding research at Pennsylvania State College, reviewed some of the accomplishments of research in this field. Some of the conclusions he advanced were: (1) The higher the pressure of the drive, the greater the oil recovery; (2) lower permeabilities do not necessarily give lower recoveries; (3) pressures being used today are sufficiently high to penetrate any sand of importance; (4) sustained high-pressure drive results in greater recovery

Clarendon Streeter, Bradford

than gradually increased pressures; (5) corrective shooting may help to maintain the desirable uniform flood front; (6) the analogy between the flow of oil in the sand and of electricity through a conductor has made possible the study of the position and effectiveness of a flood; and (7) the addition of a small amount of sodium dichromate retards the rate of corrosion, which can be very damaging when its products are deposited in or on the sand.

Two of the present problems the research staff is studying, he said, are selective plugging and the use of gas in connection with water flooding to lighten or energize the oil. The future, he concluded, may bring forth the development of chemicals which will reduce the force of adhesion binding the oil to the sand and other more efficient recovery methods which will make possible the economic development of properties now regarded as marginal.

Mr. Moorhead, Dr. Fenske, Dr. Yuster, Harry M. Rugg, the association's automotive engineer, and Fayette B. Dow, general counsel, constituted the board of experts which answered questions regarding the association during the unusual "quiz" program. Among the interesting information elicited during this program was the following:

1. Approximately 25 per cent of Pennsylvania lubricating-oil stocks, principally bright stock and cylinder oils, are disposed of in the export market.

2. The increasing variety of uses for lubricants is opening specialty fields which may prove inviting and profitable to small refiners.

3. The drilling of larger (8-in.) holes in areas of low permeability to permit the use of larger shots may make it possible to develop greater pressure gradients with consequent better recoveries.

4. Segregating and eliminating undesirable characteristics in lubricating oils is a cheaper method of improving them than by using additives.

5. The decision of the Supreme Court in the Madison appeal held that any concerted action to control prices is illegal per se despite the reasonableness or desirability of the control. The belief was expressed that conversations leading to individual corrective measures are not illegal.

6. The volume of reclaimed-oil business has become so large as to cause considerable concern to refiners specializing in lubricating-oil manufacture.

7. Automobile manufacturers are showing a tendency to recommend shorter periods between crankcase drainings instead of increasing them as they have done in recent years.

8. The difference between crude oils from the various Pennsylvania fields is a matter of yields. There is a remarkable constancy in the quality of the lubricating-oil fractions in all Pennsylvania crude.

9. The use of a "dry" natural gas in a small-scale repressuring experiment over a period of years resulted in an increase in the gravity of the crude and complete prevention of corrosion.

Mr. Dow spoke at the concluding session on the subject of taxation. He cited his appearance before the committee on special taxes for national defense in which he asked for a reconsideration of the proposal for new oil taxes since this would place the burden of raising 45 per cent of the new taxes on motorists. He also said that when the excess-profits tax was invoked during the first World War many small refiners were penalized because they had previously charged various costs to expenses whereas they should have been charged to capital.

Parker L. Melvin, of the Towne-Melvin Oil Co., Bradford, was elected president of the association, succeeding W. F. Clinger, of the Clinger Oil & Gas Co., Tidioute. A. E. Booth, Bradford, was elected first vice president and O. W. Walchli, Wellsville, N. Y., second vice president. Officers reelected are: Samuel Messer, Quaker State Oil Refining Corp., Oil City, treasurer; W. R. Reitz, Quaker State Oil Refining Corp., Oil City, assistant treasurer; John A. Beck, Pennsylvania Refining Co., Butler, corresponding secretary; J. E. Moorhead, executive secretary; S. F. Pratt, assistant secretary; and F. B. Dow, general counsel.

Two new members were added to the board of directors, which now consists of 17 producers and 13 refiners. The new members are Noel Robinson, vice president, South Penn Oil Co., Pittsburgh, and W. K. Harrington, producer, Marietta, Ohio.

Directors who were reelected are: D. T. Andrus, Bradford; John A. Beck, Pennsylvania Refining Co., Butler; A. E. Booth, Bradford; E. C. Breene, Oil City; W. J. Brundred, Brundred Oil Corp., Oil City; H. M. Carruth, Canfield Oil Co., Cleveland; W. F. Clinger, Clinger Oil & Gas Co., Tidioute; E. M. Craig, Freedom Oil Co., Freedom; C. R. Daugherty, Butler; A. D. David, Bradford-Penn Refining Co., Clarendon; C. M. Davison, Standard Oil Co. of New Jersey, New York; W. J. Healy, Healy Petroleum Co., Bradford; D. E. Hoffman, Tide Water Associated Oil Co., New York; Otto Koch, Kendall Refining Co., Bradford; H. R. Lewis, Conewango Refining Co., Warren; H. A. Logan, United Refining Co., Warren; D. B. McCalmont, Franklin; John McCoy, Columbus, Ohio; P. L. Melvin, Bradford; Samuel Messer, Quaker State Oil Refining Corp., Oil City; F. E. Richart, Wellsville, N. Y.; D. T. Ring, Preston Oil Co., Columbus, Ohio; R. G. Sonneborn Sons Co., Inc., New York; C. E. Streeter, Bradford; C. L. Suhr, Pennzoil Co., Oil City; T. P. Thompson, Jr., Bradford; S. M. Vockel, Waverly Oil Works Co., Pittsburgh, and O. W. Walchli, Wellsville, N. Y.

Producing Equipment Directory Complete Handbook of Industry

THE Producing Equipment Directory, published by the Petroleum Directory Publishing Co., Tulsa, affiliated with The Oil and Gas Journal, and just issued, is the most complete handbook of the producing industry ever compiled. It contains 299 pages of accurate and authoritative reference material covering every phase of the production of petroleum, with invaluable charts for ready consultation. It is tabbed for convenient reference, the text and the advertising pages being divided into 19 significant groups. It includes a Buyers' Guide which lists manufacturers of 1,200 items of equipment used in production work.

It is well described as a comprehensive encyclopedia of well-completion methods. Illustrative charts explain the interpretation of well logs. A table shows the oil-storing capacities of porous formations. It includes a chart for determining power needed for pumping wells of any depth. Drawings show in clear and concise form all design features used in oil-well pumps.

There are tables of recommended setting depths, collapse pressures, tensile strengths and other physical data for casing and tubing, and cementing tables for all sizes of casing, tubing, and open hole.

A step-by-step description shows how to design the completely integrated beam-pumping assembly. Tables show expected production, horsepower required and peak load for pumping wells of all depths.

Volumetric tables for casing and tubing, figured in gallons, barrels, and cubic feet, are especially designed for acidizing.

Among the many tables of practical value are those showing the relation between piston speed and revolutions per minute; the horsepower to be expected for engine cylinders of all sizes; and instructions for locating and correcting troubles in engines.

There is a complete table of constants for unit conversion; definitions of all metallurgical terms; diagrams illustrating the operation of gas-lift flow-valves and bottom-hole intermitters; engineering data necessary for designing V-belt or chain drives; volume-correction tables for wet oil; and tables giving gas-line capacity for all conditions (made by a large oil company and never before published).

The many charts are a particularly serviceable feature of the book. Among others are those showing how much a string of rods can be stretched to pull a stuck pump without deforming the rods; the static head exerted by columns of gas in wells; determining the power needed for well-servicing under specific conditions based on Weymouth's formula; heat necessary for treating; size of line for separator discharge.

Complete drawings illustrate tank-battery designs of some of the major oil companies. Methods of water disposal are described in detail.

The Producing Equipment Directory will be revised every 2 years in line with the latest knowledge and developments, insuring that the operator or engineer who becomes a habitual user of the Directory can always be sure of having an up-to-date reference at hand in years to come.

International

Mexico . .

Germany and Italy Said To Owe $5,500,000 for Oil

REPORTS from Mexico City say the war has left Mexico holding the sack—at least for the time being—for about $5,500,000 worth of oil sent to Italy and Germany. Germany, it was calculated, still owes Mexico about $2,000,000 for oil sent in exchange for steel, machinery and products. Mexico sent Italy about $3,500,000 worth of oil to pay for three tankers which were under construction when Italy entered the war. Italy did send to Mexico a second-hand tankship until the three could be delivered.

Germany, however, recently sent to Mexico by a neutral vessel a cargo of manufactured goods, including steel for bridges Mexico is building. There were reports it would continue shipments via railway through Russia, and from Vladivostok to Mexico on Russian or Japanese ships.

Meanwhile, Mexico must look elsewhere for rayon yarn it had been receiving from Italy in barter for oil.

Canada . .

Incorrectly Marked U. S. Oil Containers

THE Canadian Government has recently called attention to the fact that containers of tinned and bottled goods, such as paints, enamels, varnishes, cleaners, motor oils, etc., in pint, quart, and gallon sizes, imported into Canada from the United States, are incorrectly marked in units of the United States liquid (or wine) measure. Under the Canadian Weights and Measures Act, the United States liquid measure is illegal for trade use in Canada, as the Canadian legal gallon (the Imperial gallon) is 20 per cent larger than the United States gallon.

This question has been brought to the attention of exporters from time to time during previous years, but some American exporters are apparently unaware of the requirements and in many instances are not complying with the regulations. The Imperial gallon (1.2009 United States gallons, or about one-fifth larger than the United States gallon) is the standard measure in Canada. When the word "gallon" is used on goods to be sold in Canada, the quantity must be 160 Imperial fluid ounces by volume. The proper marking of a container holding one United States gallon would be "five-sixths Imperial gallon." The Imperial gallon contains 277.42 cu. in., while the United States gallon contains 231 cu. in. The Imperial fluid ounce is smaller than the United States fluid ounce. The United States fluid ounce equals 1.0408 Imperial fluid ounces, and the Imperial fluid ounce equals 0.9608 American fluid ounce. For the information and guidance of all shippers of the above products to Canada, there is quoted below a Canadian circular addressed to Canadian inspectors of weights and measures, which has been in force for many years:

"For many years complaints have been made as to the sale in Canada by wine measure of bottled and tinned goods—e.g., ink, essences, extracts for cold drinks, etc., pickles, olives, condiments, oils, paints, varnish, etc., the same being put up by American houses on the United States wine measure unit.

"The United States unit gallon is roughly 20 per cent smaller than the Dominion unit gallon, so the United States houses quoting on a basis of pints, quarts, etc., have an improper advantage over Canadian houses in the same business."

Venezuela . .

Chairman of V. O. C. Reports on Operations

SIR ANDREW AGNEW, chairman, speaking at the annual meeting of Venezuelan Oil Concessions, Ltd., stated that in view of war conditions he was unable to give figures on crude-oil production or shipments or much information regarding current operations. Expenditure, however, is being confined to what is strictly necessary for production and delivery of crude oil and maintenance of essential requirements and commitments. For some years, he said, the company has been operating on a policy of economy and therefore no very important further reductions have been possible.

The drilling program now comprises eight strings of tools, all employed in the Bolivar district. The exploration program of V.O.C. Development Co. has been suspended, as no success has yet been obtained by that company in finding oil in its concessions.

New Zealand . .

Gasoline Rationing Heavy Hardship

AUTOMOBILE drivers in New Zealand are now permitted from 8 to 30 gal. (Imperial) of gasoline per month under a rationing system instituted by the Oil Board. Wartime rationing of gasoline in New Zealand has created new problems, chief of which are those faced by firms with businesses which demand much use of automobiles and which find it hard to fit their work inside the 30 gal. a month allowed by the government board.

War restrictions mean that some firms have been buying used cars at low prices in order to obtain another gasoline permit which will allow them to keep their fleets of autos on the road. Doctors owning two autos receive two permits, one as medical men, the second as private owners. They find they must switch from the heavy cars usually taken for their rounds to the light British autos bought for their families.

Restriction of gasoline imports appears intended to reduce tanker tonnage necessary to supply requirements, but also to conserve foreign exchange. Socony-Vacuum's subsidiaries are among the large distributors in Australia and New Zealand.

The private owner receives 12 gal. monthly if he owns a heavy car, 8 gal. if his machine is classified as a light car—one of the British makes. Hit hardest by the rationing system are the delivery trades.

England . .

Tighter Regulations On Use of Kerosene

THE secretary for petroleum announces that he has made an order which prohibits, except under a special license, the use of paraffin or kerosene, either alone or in admixture with any other hydrocarbon oils, for the purpose of supplying motive power to a mechanically propelled vehicle, except agricultural tractors and engines.

Under the new order it is an offense to have a supply of a mixture of kerosene and any other hydrocarbon oil which is capable of being used contrary to the order. Paraffin or kerosene which includes burning and vaporizing oils and similar oils, is defined as any hydrocarbon oil having a closed flash point not less than 73° F., and not greater than 150° F.

Rumania . .

Franco-British Oil May Be Nationalized

RESHAPEMENT of the political leanings of European nations resulting from Allied defeats and almost complete surrender of France to the German war machine implies influences on the oil industry that may mount in importance as time proceeds.

King Carol of Rumania was reported reshaping his cabinet giving the pro-Nazi Iron Guard Party an influential position in affairs of the nation. Reports from Bucharest even hinted that French and British oil interests in Rumania may be nationalized. Information was that Romano-Americana, Standard of New Jersey subsidiary, would be permitted to continue to function as a private company.

If British and French interests in Rumanian petroleum affairs are nationalized it would mean government control of Astra Romana, Sheli subsidiary, and Creditul Minier, the major French concern. The combined production of French and British companies in Rumania represents approximately 70 to 75 per cent of the total output. Dominance of Rumanian production by companies domiciled in one of the two Allied countries made it difficult for Germany to get its trade-agreement quota of about 750,000 bbl. monthly during the early stages of the war. If the Rumanian Government takes over the French and British oil interests it is probable that Germany will start receiving not only the amounts of petroleum specified in last fall's trade agreement but the Reich will be able to make up for any deficiency in shipments during the first quarter.

In the Near East, Turkey has apparently abandoned the Allied cause and the government has announced that it now looks to the U.S.S.R. for political guidance. The move of Turkey implies that the Dardanelles can no longer be considered an impregnable bottle neck to prevent petroleum from reaching Germany. The Turkish decision also weakens the British defense of its near eastern petroleum supplies in Iraq and Iran.

Natural-Gas News

Pennsylvania Commission Hopes to End Long Case

HARRISBURG, Pa.—After 8½ years of litigation the Public Utility Commission is prepared to end what it considers "the most complicated and difficult case" on commission records. The case, involves rates charged by Pennsylvania Power & Light Co. of Allentown for natural gas service in Williamsport and surrounding towns. It was brought about by the company's switch from manufactured gas to the natural product, to take advantage of fields that had been tapped in the Oriskany sand of northern Pennsylvania and southern New York. Now that supply is nearing exhaustion and a movement is under way to seek a new supply in West Virginia.

Complaining the P. P. & L. was charging exorbitant rates, Rev. Charles F. Hines of Williamsport initiated the case in November 1931. He was joined by the city of Williamsport, and the boroughs of South Williamsport and Muncy.

Through the years, the case has been argued before at least 25 members of the old Public Service Commission and the present Public Utility Commission.

The present rate is approximately $2.60 for the first 1,000 cu. ft. In 1936, the commission found the rates were "unreasonable," ordered an approximate $90,000 annual reduction in company revenue, and fixed a "gateway price" of 25 cents a thousand the Pennsylvania Power & Light Co. might pay to its subsidiaries, North Branch Development Co. and Susquehanna Gas Co., for tapping the northern Pennsylvania gas field.

Both sides appealed to the state Superior Court. The court remanded the case to the commission July 15, 1937. The rate investigation was started all over again.

Northwestern Utilities Construction Program

EDMONTON, Alta.—Northwestern Utilities, Ltd., supplying natural gas to Edmonton from the Viking field, has commenced a large construction program involving an outlay of about $348,000. The program includes duplication of 5 miles of its transmission line from Viking to Edmonton. The duplicate line is of 12¾-in. o.d. pipe, and gradual construction has been in progress since 1929, with about 25 miles still to be laid.

To augment the company's gas supply, the field end of the transmission system will be extended from the Viking field to one of the company's wells in the Kinsella field, the extension consisting of 6 miles of 10¾-in. o.d. pipe and 8 miles of 6-in., with an outlay of $170,000.

Other capital expenditures include tubing of one well in the Viking field, the installation of cathodic protection on existing lines of the transmission system, extensions to the present distribution with service and meter installations, improvements to the company's pipe yard in Edmonton and the installation of dehydration equipment in the company's production system: these outlays approximating $70,000.

Hearing on Pennsylvania Line to New York

HARRISBURG, Pa., June 24.—War industries in southern New York might be hampered if Pennsylvania's Public Utility Commission refuses to allow construction of a natural-gas pipe line across this state, the commission was told. Pres. Irving H. Peck, of Home Natural Gas Co., Binghamton, N. Y., advanced that argument at a hearing on the company's application for authority to build the lines across Pennsylvania from the West Virginia gas fields. He declined to elaborate on what industrial plants he had in mind, but urged the commission to authorize 117 miles of new pipe lines. They would enable the company to get 2,500,000,000 cu. ft. annually for the next 15 years through Pennsylvania companies.

Mr. Peck said that after the depletion of the gas supply from Belmont Quadrangle Drilling Co. of Bradford, Pa., last winter "every means" of obtaining new supply had been exhausted, and a critical shortage was imminent this year "even with a mild winter."

Home Natural Gas Co. sells to utilities serving 50,000 commercial and domestic customers in Binghampton, Johnson City, Endicott, Olean, Nyack, Port Jervis, Goshen and Middletown, N. Y. Mr. Peck said they would be without gas if the contract were rejected.

The Home firm can get the required gas from the United Fuel Gas Co. of Charleston, W. Va., through the Pennsylvania line, if approved. The line would supplement present facilities of Manufacturers' Light & Heat Co., Pennsylvania Fuel Supply Co., and Manufacturers' Gas Co. which, like the Home Natural Gas Co., are affiliates of the Columbia Gas & Electric Co.

The additional 117 miles of line would cost $1,684,759. The three Pennsylvania firms, which already have instituted merger proceedings before the Utility Commission, would borrow $7,500,000 from Columbia. The loan also is subject to commission approval.

Home Natural Gas Co. would pay the three Pennsylvania firms 10.65 cents per 1,000 cu. ft. for line facilities, amounting to about $266,000 a year. In addition, the company would pay the West Virginian firm 30 cents per 1,000 cu. ft., making a total of 40.65 cents. The Home company now is charging about 43 cents for gas furnished the delivery utilities, but Mr. Peck said that probably would be boosted to about 50 cents, leaving prices to consumers a matter for "adjustment." The consumer price now, he said, ranges from 59 cents to $1.11, depending on the class of consumer.

Royal Commission Reports on Alberta Oil and Gas

EDMONTON, Alta.—The McGillivray Royal Commission, appointed in 1938 to investigate the petroleum and natural-gas industries in Alberta, has made its report to the Alberta government. The commission, comprising Judge A. A. McGillivray, chairman, and Maj. L. R. Lipsett, carried on investigations over a 15-month period ending December 30, 1939.

The report gives the petroleum industry in Alberta a clean bill of health, finding that existing prices for petroleum products are fair and reasonable. The retail gasoline spread of 4½ cents in Calgary and Edmonton is reasonable, though it is said there are some unreasonable spreads in outlying sections.

The board finds that the basic crude price of $1.20 a barrel is comparable with the Montana price, without allowing for the recently ordered reduction of 8 cents a barrel in pipe-line and loading charges. This should be added to the retail price, representing an increase of $580,000 a year to producers.

If crude-oil production continues as in 1939, the known oil reserves of Alberta will be exhausted in 14 years; though new discoveries will probably be made. To encourage development, the province should reduce or forego royalties on acreage adjacent to discovery wells and waive drilling requirements in proven areas where the lessee is doing corresponding exploratory work.

Unit operation is not now practical in Turner Valley, but should be enforced by the government in new fields.

Gasoline processed from Turner Valley crude cannot hope to reach beyond its present market limit of Portage la Prairie, Man., without more favorable transportation rates; and application for a review of such rates should be pressed. Enforcement of antidumping laws would extend southward the market for Turner Valley products.

The petroleum industry is not guilty of improper practices, of making undue profits or of exacting exorbitant prices. Study of the Imperial refining and distributing operations indicates that returns are reasonable, and neither refinery nor wholesale prices need to be reduced. The charge made for Ethyl fluid to Alberta refineries is not too high.

Gasoline standards would be a progressive move, but they should not be placed in effect unless rigidly enforced nor without a full hearing of the industry. Gasoline tax revenue should be earmarked for construction and maintenance of government highways. Refunds of gasoline tax to farmers and others should be based on formal application supported by a sworn statement, the method in use before the present coupon system was introduced.

The commission finds that government price fixing for gasoline is not necessary in Alberta; and that competition will maintain prices at a reasonable figure.

The commission recommends a thorough overhauling of conservation legislation, with a widening of the powers of the Alberta Conservation Board to enable it to keep in touch with and control all operations of the petroleum and natural-gas industries. The whole subject of natural-gas wells in Turner Valley should be reexamined; and new conservation legislation passed only after discussion with the industry. Rulings of the conservation board should be subject to appeal to the courts when a question of equity is raised.

Following the report, the Alberta government indicated that the recommendation of an increase in crude prices from $1.20 to $1.28 would not be put into full effect, though a portion of the 8-cent-per-barrel saving on pipe-line charges might go to the producers. Since the investigation started, reductions have been made in gasoline prices; and the posting company has been notified by the government that further reductions are expected. Measures fixing standards for petroleum products, and widening the duties of the Alberta Conservation Board will be introduced; and, to provide trained technicians for the industry, a chair of petroleum engineering will be established at the University of Alberta.

Turner Valley Gas Quotas

CALGARY, Alta.—The Alberta Conservation Board has submitted to operators of Turner Valley gas wells a tentative proposal to reduce the aggregate allowable production from gas-naphtha wells from 62,000,000 to 55,000,000 cu. ft. a day. The measure is being taken with a view to protecting the gas cap, which is necessary to the successful operation of the west flank crude wells. At the peak of production in 1930 the field had an open flow of around 500,000,000 cu. ft. a day, most of which was wasted. Definite action was deferred pending a study of the report of the McGillivray Commission.

Natural Gasoline

Hunt Recycling Plant in Operation at Long Lake

FORT WORTH, Tex.—Hunt Oil Co.'s new recycling plant at Long Lake has started operations, the fourth plant in the field and the sixth in Anderson County.

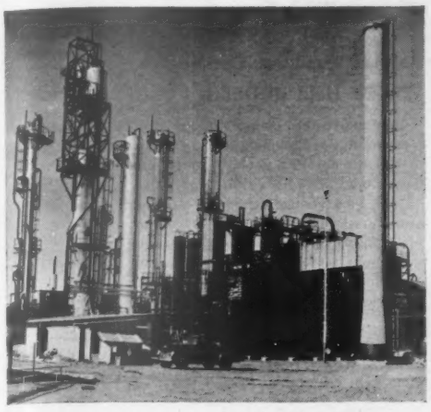
The newest plant has a daily capacity of 50,000,000 cu. ft. and is second only to the Tide Water-Seaboard plant in the same field, which has a daily capacity of approximately 60,000,000 cu. ft.

The Hunt Co. owns considerable gas-distillate acreage in the Long Lake field, having acquired holdings from the Tide Water and Seaboard partnership after the latter discovered the field in 1933.

Canadian Aviation-Gasoline Reserves Declared Ample

OTTAWA, Ont.—The federal Department of Munitions and Supplies has announced that reserves of high-grade aviation gasoline in Canada are now very substantially in excess of the Royal Canadian Air Force and air-training-plan requirements during the coming year. The reserves have been built up voluntarily by oil companies, and the capacity of Canadian oil refineries is sufficient to take care of the expanding needs of the R.C.A.F. and air-training plan in 1941 and 1942.

Refinery Expansion



Construction View of Continental Oil Co.'s New Poly Unit

WICHITA FALLS, Tex.—Construction of Continental Oil Co.'s new thermal polymerization unit at its refinery here has been completed, except for tying in and cleaning up, and the unit is expected to be placed completely on stream within a short time. The 20-mile, 4-in. pipe line from the refinery to the company's main natural-gasoline plant in the K.M.A. field has been completed and transporting of the raw product to the refinery was started the first of this week where it is stored in four 1,000-bbl. pressure tanks. Capacity of the new poly unit, which also includes facilities for stabilizing the raw natural gasoline, is from 2,500 to 3,000 bbl. daily including charging stock from the cracking units. This is expected to yield approximately 300 bbl. of high-octane polymer daily. Cost of the new processing equipment and pipe line was in excess of $750,000. The new poly unit is shown in the foreground of the accompanying photograph, with the crude-refining equipment in the background.

Atlantic Will Construct New Delaware Terminal

Atlantic Refining Co. has started construction of a new terminal at Fort Mifflin, on the Delaware River, for the reception of tanker shipments of crude oil, chiefly from the Texas fields. Completion is scheduled for late in the fall.

The dock structure at the new terminal will be of concrete and will be capable of accommodating three of the company's new 550-ft. tankers at the same time. Crude petroleum will be discharged from the tankers into four shore tanks with a capacity of 80,000 bbl. each. From the new terminal the oil will be pumped through two 16-in. pipe lines to the company's refinery at Point Breeze on the Schuylkill River, a distance of about 5 miles.

Officers of the company"s marine department will be located at the Fort Mifflin terminal. In addition facilities will be provided for storing and provisioning the ships, for repairs, and for the accommodation of officers and seamen. Most of the docks at the Point Breeze refinery will continue to be used by the company"s smaller tankers, but the larger oil carriers will discharge their cargoes at Fort Mifflin.

Navy Contracts Awarded On the Pacific Coast

LOS ANGELES, Calif.—Shell Oil Co., Inc., with an award of 2,492,000 bbl., and Union Oil Co., with 2,073,000 bbl., received the larger share of the contracts for the 8,500,000 bbl. of fuel oil which the Navy will buy here for use of the fleet during the next 6 months.

Remainder of the contracts were: Tide Water Associated Oil Co., 1,020,000 bbl.; Richfield Oil Co., 1,400,000 bbl.; Texas Co., 900,000 bbl.; General Petroleum Corp., 500,000 bbl.; Pacific States Oil Co., 200,000 bbl.; Standard Oil Co. of California, 23,000 bbl., and Signal Oil Co., 4,000 bbl.

Prices were not disclosed but it is reported the tenders submitted by Union and Shell were for approximately 65 cents per barrel. Most of the fuel will be delivered to Navy tankers at San Pedro, although Shell Oil Co., Inc., will deliver 240,000 bbl. at the Pearl Harbor (Hawaii) base.

Falls City Refinery Awaits Field Result

FALLS CITY, Neb.—Until additional oil wells are brought in actual construction of a refinery in Richardson County would be impractical, it was agreed at a meeting here of the Omaha and Falls City Chambers of Commerce.

New Method of Processing Oil to Obtain Toluene

BALTIMORE, Md.—A new method of processing crude oil and gasoline to obtain toluene, principal ingredient of TNT, assuring a supply of explosive in event of war, was reported to the American Association for the Advancement of Science by Dr. Gustav Egloff, Chicago, who said that under the present method only 25,000,000 gal. of toluene can be produced yearly. The new system would make available between one and two billion gallons annually.

Importance of the discovery was emphasized by C. R. Wagner of Pine Oil Co., Chicago, who declared England must now be either using an inferior substitute for TNT or obtaining toluene from some process not yet known to science.

"The English claim to have dropped 100,000 bombs on Germany during May," Mr. Wagner said. "The TNT in those bombs represents about 10 or 11 million gallons of toluene and they are, as far as we know, still getting their toluene from coal tar. In that case, they can't keep it up."

A few months ago toluene was selling at 25 cents per gallon, compared with about 50 cents today, Mr. Wagner said, while near the close of the World War a gallon brought $3.60 "even in tank-car lots." He said the toluene now available in the United States would not be "10 per cent of what we need in a real all-get-out war."

Bell Plans Improvements at Oklahoma Refineries

Bell Oil & Gas Co. announces extensive additions and improvements to its refinery at Grandfield, Okla., and also to the Ben Franklin Refinery at Ardmore, Okla.

The Grandfield plant has just completed revamping of its straightrun distillation apparatus, including the enlargements of its pipe still and installation of new modern burners which have resulted in increasing capacity of the No. 1 pipe still to 4,000 bbl. per day. New pumps have been added to the equipment to assist units.

Bell has also installed an entirely new firing system on its Dubbs cracking unit, and has completed the revamping of the vapor-recovery system, resulting in increased octane on the octanized gasoline. In addition, Bell is now installing a new centrifugal hot-oil pump for increased capacity, and made to meet the special requirements of the Grandfield plant. It is of special alloy steel for this new design pump, the unit alone costing in excess of $18,000, plus the installation.

At the Ben Franklin plant a complete new treating system has been installed which has improved the quality of the gasoline and has cut down the quantity of chemical required in the treating process. The principal purpose of installing the new treating process was to reduce the loss in octane value occurring in the usual method of treating. To meet the new requirements of Ethyl Corp. Bell has installed the more modern methods so that both the straightrun and cracked gasoline would retain their highest octane value prior to being treated with lead.

Lethbridge Gas Franchise

LETHBRIDGE, Alta.—Burgesses of Lethbridge by a vote of 328 to 15 approved a franchise to Canadian Western Natural Gas, Light, Heat & Power Co. of Calgary.

Pipe-Line Activity

Panhandle Eastern Plans $2,800,000 Expansion

The Panhandle Eastern Pipe Line Co., with headquarters in Kansas City, Mo., is completing plans to enlarge its natural-gas trunk-line system, involving an expenditure of $2,800,000. The new work is in addition to that authorized the latter part of last year and now being completed, costing $3,500,000. The line obtains its natural gas from the Hugoton, Kansas, and Panhandle, Texas, fields, and its trunk-line systems crossing several states connects to markets in the Middle West.

It was announced that the project is to "provide additional facilities for the company's growing market requirements." The work will be financed out of the present working capital, J. D. Creveling, president, announced.

The new pipe-line construction will include the following installations of 24-in. line at existing stations: Liberal, Kans., 7.57 miles; Greensburg, Kans., 8.06 miles; Haven, Kans., 8.25 miles; Olpe, Kans., 8.29 miles; Louisburg, Mo., 7.89 miles; Houstonia, Mo., 6.06 miles; Centralia, Mo., 6.13 miles; Pleasant Hill, Ill., 12.94 miles; Glen Arm, Ill., 16.40 miles; Tuscola, Ill., 23.79 miles. The installation at Tuscola will be 20-in.

At Sneed, Tex., a 1,300-hp. unit will be added to the station. A new station with a capacity of approximately 4,000 hp. will be installed near the Oklahoma-Texas line. The National Tube Co. has been awarded the contract for the pipe.

Basin Pipe Line Co. to Lay Gatherine Line

BIG SPRING, Tex.—Basin Pipe Line Co. plans to supplement its 96-mile 6-in. pipe line from the Wasson-Bennett field of Gaines and Yoakum counties, bordering the New Mexico-Texas line, to Big Spring—recently announced—by a 11-mile gathering system in the producing area. The pipe line will serve Cosden Petroleum Corp.'s refinery here with crude. The latter company has contracted to purchase 5,000 bbl. daily for a period of 5 years at the posted price of majors at the well, plus transportation cost.

Kansas Pipe & Gas Company Laying Line to McCook

McCOOK, Neb.—Aksarben Natural Gas Co. has purchased the artificial-gas distribution system in McCook. The change to natural gas will be made about July 25 and the two small towns of Indianola and Bartley will also be piped. The Aksarben head office has been moved to McCook.

The Kansas Pipe Line & Gas Co. is now laying 35 miles of pipe line from Cambridge to McCook and also the laterals to Indianola and Bartley.

PROGRAMS AND MEETINGS

Form Michigan Chapter Division of Production

A Michigan chapter of the American Petroleum Institute, Division of Production, was organized Friday night, June 21, at Mount Pleasant. Ninety Michigan oil men became members. Officers were elected as follows: Chairman, Marshall R. Joy of Mount Pleasant; first vice chairman, C. C. Irby of Mount Pleasant; second vice chairman, A. H. Ledbetter of Mount Pleasant; secretary-treasurer, Allen E. Morrow of Mount Pleasant.

Advisory committee members are: H. L. Donhaiser of Saginaw, T. Glen Caley of Saginaw, George Bell of Grand Rapids, Kurt De Cousser of Lansing, Glen Slight of Mount Pleasant, Jed B. Maebius of Saginaw, Gus Frye of Lansing, Gerald Cotter of Mount Pleasant, Walter Leonard of St. Louis and Harold McClure of Alma. Speakers were M. M. Hutchinson, Cities Service Co. petroleum-production engineer, and Dr. E. J. Merrill, assistant professor of chemistry at Central State Teachers College.

Oklahoma and Kansas Tax Committee Meets

At a meeting of the Kansas and Oklahoma oil company tax representatives Friday night at the Mayo Hotel, Tulsa, the principal address was by William G. Cullen, head of the southwestern district technical staff of the internal revenue department. Seventy-nine attended the meeting, 14 coming from Bartlesville, 6 from Oklahoma City, 5 from Ponca City, 3 from Ardmore, 1 each from Sand Springs and Duncan, from Kansas and from Dallas, Tex.

Oil to Be Represented at National Chemical Show

Satisfactory progress is reported on preparations for the first annual National Chemical Exposition, sponsored by the Chicago section of the American Chemical Society, to be held December 11 to 15 at the Stevens Hotel in Chicago.

L. M. Henderson, Pure Oil Co., and G. L. Parkhurst, Standard Oil Co. of Indiana, are members of the show committee. Cary R. Wagner, Pure Oil Co., chairman of the Chicago section, is a member exofficio.

Petroleum Accountants Elect W. A. Russell

W. A. Russell, Seaboard Oil Co., was elected president of the Petroleum Accountants Society of Los Angeles, Calif., at the recent annual meeting. Other officers elected are: D. A. Moore, Wilshire Oil Co., first vice president; I. J. Hancock, Union Oil Co., second vice president; N. J. Allen, Lincoln Petroleum Co., secretary-treasurer. Mr. Russell succeeds L. A. Williford, Macmillan Petroleum Corp., as president. Mr. Moore, Mr. Allen, and W. B. Thomson, Kettleman North Dome Association, were reelected directors, and J. P. Vezzetti, Sunset Oil Co., and H. J. Brown, Shell Oil Co., Inc., were elected to fill vacancies on the board.

The new president entered the oil business as an accountant with Seaboard Oil Co. in Mexico, and has been with that company in California since 1924.

Pennsylvania Grade Association Permits Use of Additives

OIL CITY, Pa.—Permission to use efficient additives in limited concentration in emblem oils has been granted to refiner and jobber members of the Pennsylvanian Grade Crude Oil Association according to an announcement made here. It is understood the association does not approve any particular agent but merely extends the privilege of using such materials in emblem oils to its membership. The use of additives is regarded as a move to improve, not cheapen, the product.

This permission will be entirely a matter of choice for the individual member and the association will not require any licensee to use such agents. Numerous tests on the effects of using such addition agents have been made in the association's laboratories and in those of its members. Granting of this permission does not alter in any way the existing regulations of the association with respect to the specifications necessary to meet established standards. All of these standards remain in effect.

Asphalt Institute Conference Will Be Held at Dallas

The executive committee of the Asphalt Institute reports selection of Dallas, Tex., as the place for the thirteenth national asphalt conference during the week beginning November 25.

J. E. Pennybacker, managing director of the institute, announced that Dallas had been chosen after considering many competing cities. It is the custom to rotate this selection, the three preceding conferences having been held in New Orleans, Memphis and Los Angeles, respectively.

Houston Committee Decides For Oil Show in 1942

HOUSTON, Tex.—The executive committee of Oil World Exposition, Inc., has voted to continue plans for a show here in 1942, 1 month before the International Petroleum Exposition is held in Tulsa.

Officials of the International Petroleum Exposition 2 weeks ago rejected for the third time a proposal by the Houston show officials that one show be held every 2 years, alternating between the two cities.

Dates for the Houston show in 1942 were set April 11-18. The International Petroleum Exposition will be held in Tulsa May 16-23.

It was said the executive committee of the Houston show decided to go ahead with plans for the 1942 exposition to "drive the issue through." The committee decided to plan for the exposition at Sam Houston Coliseum as in the past. New ground, it was said, may be secured before the show, however.

Minnesota's Gasoline Tax Lower

The state gasoline tax in Minnesota, raised from 3 cents a gallon to 4 in 1937 to raise money with which to match federal funds available for highway-building purposes, will drop to 3 cents September 1.

CALENDAR OF EVENTS

June

AMERICAN SOCIETY FOR TESTING MATERIALS, Chalfonte-Haddon Hall, Atlantic City, N. J., June 24-28.

ILLINOIS BASIN CHAPTER OF AMERICAN PETROLEUM INSTITUTE, McCurdy Hotel, Evansville, Ind., June 29.

September

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Spokane, Wash., September 3-5.

AMERICAN CHEMICAL SOCIETY, Detroit, Mich., September 9-13.

NATIONAL PETROLEUM ASSOCIATION, thirty-eighth annual meeting, Hotel Traymore, Atlantic City, N. J., September 18-20.

NATIONAL LUBRICATING GREASE INSTITUTE, annual convention, Stevens Hotel, Chicago, September 30-October 1.

October

NORTH AMERICAN GASOLINE TAX CONFERENCE, Whitley Hotel, Montgomery, Ala., October 3-5.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Wichita, Kans., October 4.

AMERICAN GAS ASSOCIATION, Atlantic City, N. J., October 7-10.

NATIONAL SAFETY CONGRESS, Stevens Hotel, Chicago, October 7-11.

AUTOMOBILE MANUFACTURERS ASSOCIATION, Auto Show, New York, October 12.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, eleventh annual meeting, Dallas, Tex., October 16-18.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Shreveport, La., October 25.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, annual convention, celebrating Texas oil's forty-fifth birthday, Fort Worth, Tex., October 21-November 2.

November

AMERICAN PETROLEUM INSTITUTE, twenty-first annual meeting, Stevens Hotel, Chicago, November 11-15.

December

EXPOSITION OF CHEMICAL INDUSTRIES, Grand Central Palace, New York, December 1-6.

1941

March

AMERICAN SOCIETY FOR TESTING MATERIALS, Hotel Mayflower, Washington, D. C., March 3-7.

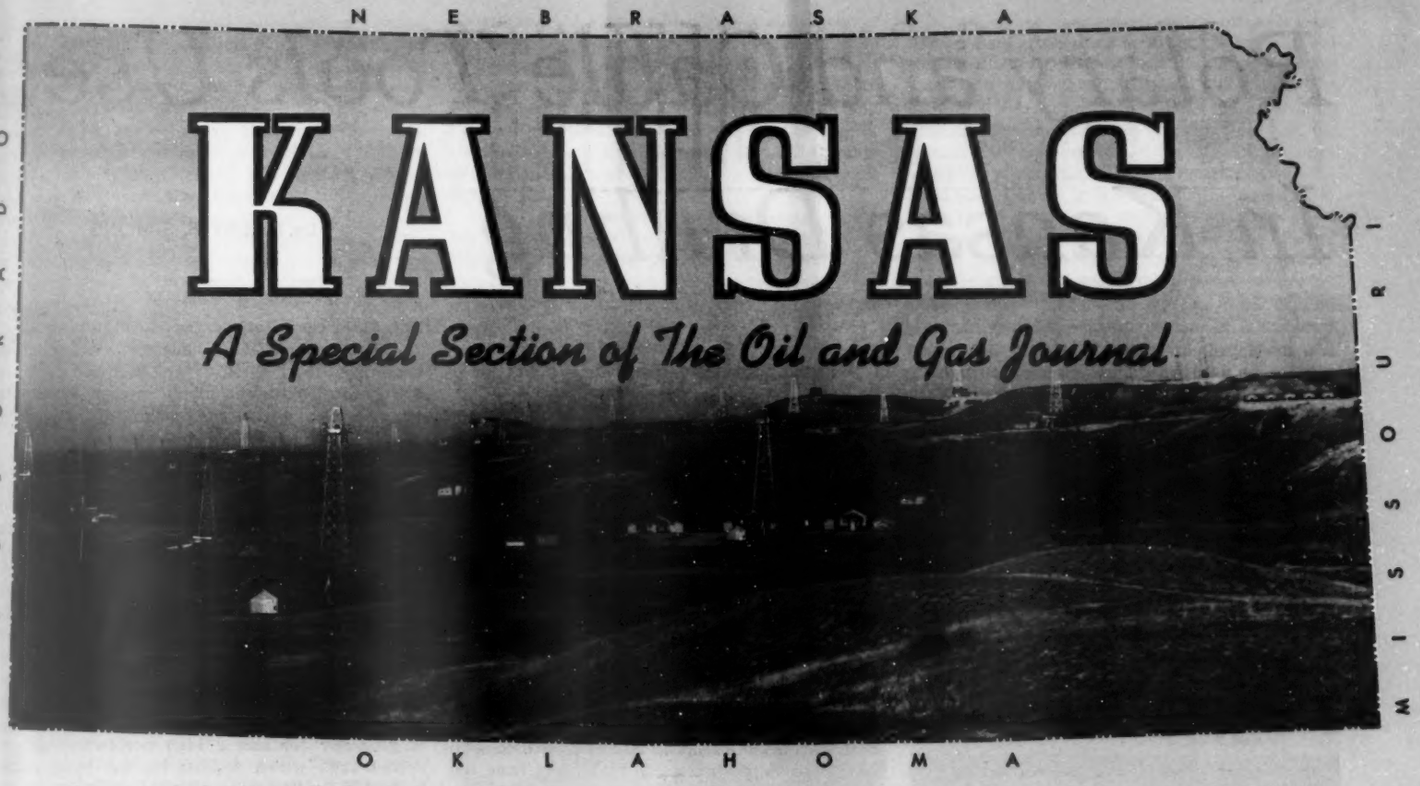
April

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, twenty-sixth annual meeting, Rice Hotel, Houston, Tex., April 2, 3, and 4.

NATIONAL PETROLEUM ASSOCIATION, semi-annual meeting, Hotel Cleveland, Cleveland, Ohio, April 24-25.

June

AMERICAN SOCIETY FOR TESTING MATERIALS, forty-fourth annual meeting, Palmer House, Chicago, June 23-27.



Kansas Today

Drilling . . .

There were 286 active field operations, including 39 rigs and 247 drilling wells, on June 1, as compared with 246 on the corresponding date in 1939 and 202 in 1938. A total of 737 wells had been completed this year to June 15, compared with 529 on the same date in 1939. Locations, not included in the tabulation, had increased correspondingly over the last 2 years.

Production . . .

Daily average production as of June 15, 1940, was 170,650 bbl., from 19,931 wells. On June 15, 1939, the average was 168,550 bbl. from 19,097 wells, and on that date in 1938 it was 159,550 bbl. from 18,398 wells. Potential production was the highest in history on June 1, totaling 5,384,182 bbl., as compared with 4,021,338 bbl. a year ago and 365,000 bbl. in May, 1934.

Exploration . . .

Some 20 new producing areas have been opened this year, including extensions and new pay discoveries in older pools. One new county, Jefferson, in the Forest City basin, was added to the productive areas late in May. Wildcatting increased in June, 15 outposts being started in 1 week. More than one-fourth of 52,335,360 acres in the state is under lease at this time.

Reserves . . .

Estimated proven reserves in Kansas, as of May 1, 1940, were 756,426,000 bbl., a net gain of 22,484,000 bbl. in the first 4 months of this year. If the rate of increase continues for the rest of the year, Kansas reserves will pass the 800,000,000-bbl. mark by January 1, 1941.

Natural Gas . . .

The Hugoton field in southwestern Kansas, one of the larger gas fields in the world, has an estimated reserve of 13,500,000,000,000 cu. ft., lies in seven counties and has not been defined. With Hugoton and several other big fields, Kansas rates among the leading natural-gas areas in the world. Additional large gas reserves are represented by the Cunningham, Medicine Lodge, Otis and Lyons pools.

Refining . . .

Twenty operating refineries have a crude-oil capacity of 175,500 bbl. daily, with crude runs to stills averaging 145,000 bbl. daily. Most of the refineries are well balanced in their operations, with cracking capacities totaling 93,240 bbl. daily. Output of refineries far exceeds Kansas requirements and finished products are sold in several states.

Natural-Gasoline Manufacture . . .

Fourteen natural-gasoline plants have a combined capacity of 379,500 gal. daily, with a production of 175,000 gal. daily at this time. Most of the production comes from plants which extract gasoline from natural gas.

Pipe Lines . . .

Kansas oil fields are served by 17 pipe-line systems. Some of the systems are local, gathering oil for Kansas refineries, while others are part of major interstate pipe-line systems. Five gasoline pipe lines and 13 natural-gas trunk lines are operated in the state. There are several gas pipe lines in prospect for the Hugoton field, a development which would lead to increased activity in that area.

Rotary and Cable Tools Used In Kansas Drilling

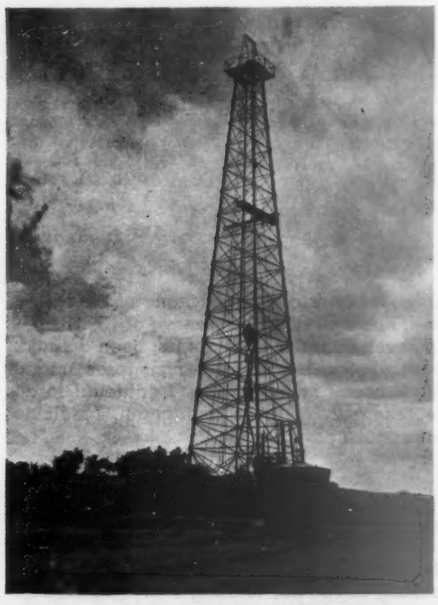
By HARRY F. SIMONS

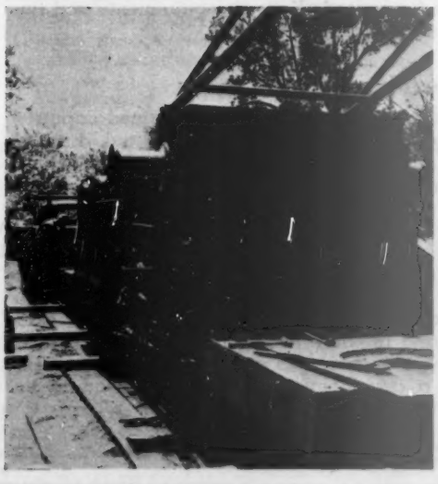
KANSAS is one of the areas being currently developed in which cable-tool and rotary rigs can be used with equal success although the latter drill most of the holes in the state. While there are a number of cable-tool "big holes" drilled annually, the principal use of this type of drilling is in the completion of wells after the rotary rigs have set pipe in the top of the lime pays. Most of the formations have low pressures and there is great danger of contaminating the producing zone and ruining the well if a rotary is used for drilling in. Cable tools are also often used on wildcats, as a small well in a low-pressure sand could easily be missed without an adequate test if a rotary were employed.

Speed of drilling gives the rotary rig a decided advantage in drilling to the pay zone and it is for this reason that rotaries are used where there is competitive development. It takes approximately 15 days to rig up a rotary, drill the hole, and set the pay string on the average well of 3,300 ft. to the Arbuckle lime. The same well drilled with cable tools requires from 30 to 35 days from the top of the ground to completion; about 5 days are allowed for completing a well. Contract price for the rotary-drilled hole varies from $2.75 to $3.75 per foot, depending on what is furnished and whether the well is completed by the contractor. Cable-tool contract price is around $2 to $2.75 per foot, with the producing company furnishing derrick, bull wheels, calf wheels, and pipe.

Equal opportunity exists in Kansas for both rotary and cable tools although the former drills most of the hole while the latter is used mostly for completion. There have been numerous advances in both methods in recent years. Portability and small holes are two of the most important problems at present.

Cost of a completed 3,300-ft. well is approximately $18,000, not including tankage. Following are the principal items: Derrick, $1,000; drilling contract $9,570; day work, $1,000; core-barrel heads, $250; derrick erection, $350; teaming and trucking $1,100; filling cellar and pits, $100; company payroll, $250; surface pipe (250 ft. 8⅝-in. o.d., 32-lb.-per-ft. lapweld pipe at 75 cents per foot), $188; pay string (3,350 ft., 5½-in. o.d., 14-lb.-per-ft. seamless pipe at 68 cents per foot), $2,278; cement for casing (175 sacks), $332; guide shoes and float, $137; cementing service, $290; tubing 3,350 ft. 2½-in. o.d., EUE, 6.5-lb.-per-ft. tubing at 38 cents per foot), $1,273; well-head connections, $200; crown block and tubing catcher, $250; acidizing service, $366; and repairs, supplies and miscellaneous, $470.





Left: Regular rotary rig with two engines and 125-ft. derrick. Left below: Semiportable rig mounted on two skids with sectional mast. Below: Portable rig mounted on truck with unitized mast

Mechanical Rigs

Mechanically driven rigs were pioneered on a large scale in Kansas, the advent of that state as a producing area coming simultaneously with the first use on a large scale of internal-combustion engines as a source of motive power for drilling. The development of Kansas really gave an impetus to the advancement and improvement of the mechanical rotary as the area, with the exception of a few minor cases, lacks a cheap water supply for drilling. Often surface-water or shallow-water producing zones may be available but it generally contains a high percentage of dissolved salts which forbids its use in a steam boiler; it can be used for mud, however.

Another factor affecting boiler operation is the lack of gas in practically all of the fields which makes it necessary to purchase fuel, either gas, gasoline, butane, diesel or fuel oil. At the present time there are very few steam rigs, either cable tools or rotaries, at work in the state. An efficient steam rig which treats and condenses the boiler water can be used economically in some fields. The lack of gas as a drilling fuel not only made boiler operation expensive but it also dictated to some extent the type of engines used for power on mechanical rigs. While many of the rigs are equipped with engines which will operate efficiently on gas or butane, many rigs have diesel engines. Gasoline-powered rigs are not numerous as this fuel is also expensive when used for drilling. It does have the virtue of being universally distributed and hence it is used at times for wildcat driling where gas, butane, and diesel fuel are unavailable or are high priced.

At the same time rotary rigs were being mechanized, cable tools were likewise remodeled, the steam power being replaced by mechanical power, until at the present time the motor-driven drilling rig is a common sight while the steam rig is not.

Practically every type of mechanical or electric rotary rig can be found in Kansas, including straight mechanical, mechanical-electric, part mechanical and part mechanical-electric and straight electric. The most common type of rig, and the one finding widest application, is the straight mechanical rig having two multiple-cylinder engines (4, 6, or 8 cylinders) with a 160-hp. rating each. The latter figure is an average one as the horsepower of engines used on rigs varies from 100 to 250 hp. Rigs using two engines are generally of standard design which provides for compounding of the engines for either hoisting or pumping when desired. There are also some rigs which have two twin-cylinder diesel engines, one driving the hoist and the other the pump; these engines cannot be compounded.

Rotary drilling in the state is definitely on a small-hole basis regardless of the size of rig used. Slim-hole drilling, introduced several years ago

for the drilling of prospect holes and now being used widely for the drilling of producing wells, has shown the way and practically all operators are anxious to obtain the savings of a smaller hole and smaller casing.

Instead of the 8¼-in. to 11-in. holes formerly drilled, present sizes range from 6¼ in. to 7⅞ in. In the former case, 6⅝-in., 7-in. and 8⅝-in. casing was run while now the most popular casing sizes are 4½-in., 9.5-lb. per ft., and 5½-in., 14-lb. per ft. pipe. Following is a table showing the size of drill pipe used, size of hole drilled and size of casing set. The first three are used only in unusual cases.

Diam. of hole drilled below surface pipe (in.)	Size of drill pipe (in.)	Size of casing set (in.)
11	6⅝	8⅝ o.d.
9⅞ to 11	5	7 o.d.
8¾ to 9	4½	7 o.d.
7⅞	4½, 3½	5½ o.d.
7⅞	3½	5½ o.d. & 5-in. welded
6¾	3½ Int. flush T.J.	4½ o.d., 9.5 lb.
6¼	3½ Reg. T.J.	4½ o.d., 9.5 lb.
6¼	2⅞ Int. flush	5 welded

Drilling of the smaller holes has led to change in the drill-stem equipment, with the trend being definitely toward smaller pipe. Several years ago the size of drill pipe most commonly used in Kansas was reduced from 5⅝ in. and 5⅞ in. to 4½ in., the occasion being the reduction in the size of hole and casing run. Now the size of the drill pipe is again being reduced, this time to 3½ in. as this size provides ample clearance in the smaller holes. The tool joint on 3½-in. drill pipe has an external diameter of 4¼ in. to 4½ in., depending on the size and type of joint used, while the tool joint on 4½-in. drill pipe has an external diameter of 5½ to 5¾ in. It is obvious that the latter may be a source of trouble in a 6¼-in. hole. When internal-flush drill pipe is used, a slightly larger hole is drilled to allow for the larger diameter of the tool joints.

The smaller pipe is not only cheaper but it is also less expensive to maintain and move and it also wears longer. Most contractors are using existing strings of 4½-in. drill pipe and drilling the larger holes until this drill pipe is ready to be discarded and they are then replacing it with 3½-in. pipe.

Good service is obtained from drill pipe in the state, most strings obtaining somewhere between 125,000 to 150,000 ft. before they must be discarded. Such footages are recorded for pipe run in the proper manner in the correct-size hole. Speed of rotation seems to greatly affect the service obtained and, except when starting a hole, pipe is rarely rotated over 80 r.p.m. and generally between 70 and 75 r.p.m.

Rigs which have been active in the area for some time have had their depth capacity increased by the reduction in the size of the hole and the size of the drill pipe used as the difference in weight between 3½-in. and 4½-in. pipe is approximately 24 per cent. These rigs are continuing to be active despite the competition from newer and smaller rigs. These rigs will regain the advantage when the drilling campaign enters the deeper areas.

New rotary rigs are generally small, compact, light, and efficient and are designed for economical drilling down to 4,500 ft. In many cases they are either slim-hole rigs with unitized masts or are standard-design rotaries with or without masts. New mud pumps are also small, the reduced hole size not requiring the fluid capacity of the larger hole; pumps with 12 or 14-in. stroke are favored on the regular rotaries while 10 or 12-in.-stroke pumps are used on the slim-hole rigs.

The smaller holes have not effected any reduction in drilling time nor reduction in the number of bits used. The bit costs per well will be approximately the same regardless of the size of hole, the reduction in the cost due to size being equalized by a slight increase in the number of bits used.

The number of bits used depends on the formations penetrated, wells being drilled to the Arbuckle lime requiring a greater number of bits than wells drilled to the Kansas City-Lansing, although the depths are similar. All of the rotary drilling in the area is with rock bits except the surface hole.

In one area, where the pay zone is the Arbuckle, the number of rock bits used varies from 8 to 11, while in a field being drilled to the Kansas City-Lansing lime, the number of bits required is five or six. The depths are practically identical, but the Arbuckle is Ordovician in age while the Kansas City-Lansing is Pennsylvanian and consequently wells in the former pass through older formations.

Left above: Preparing wire line for swivel socket. Above: Kansas cable-tool rig drilling from surface to Kansas City-Lansing lime. Left: Cable-tool rig used for completion

While the drilling is comparatively shallow, the average depth of the wells being about 3,300 ft., numerous hard streaks are encountered and the area cannot be classified as one where the drilling is easy and without complications. Unusually hard streaks are often found in some formations, while in some areas the same zones may not show any decrease in the rate of penetration or increase in bit wear. A geologic cross-section of Kansas, which appears elsewhere in this issue, will give the depth of these formations in various areas.

A list of the formations which often are unusually hard or abrasive includes the Dakota sandstone, which often has some pyrite in it; the Florence flint (Permian), which is hard and slow drilling; the Americus-Foraker (base of Permian); chert zones in the Topeka lime and the Kansas City-Lansing lime; the Mississippi chat, which is sometimes a cherty conglomerate; the Viola lime (where it is found) with often almost-solid chert in the top; the Simpson sand, which in some areas is almost quartzite; and the Arbuckle lime, which often has a cherty phase.

On wildcat wells the drilling crews cannot anticipate these formations, but in field drilling, careful logging may result in the saving of a bit or two per well as the abrasive formations may be completely or partially drilled with a bit which is almost worn, and there is no economy in replacing bits when a hard stretch is approached. Running a new bit in the hole on top of these hard formations would result in its being dulled so badly that cutting of the underlying tougher and less abrasive formations would be at a slow rate.

Formations in Kansas do not dip steeply and there is little danger of the holes deviating to any great extent unless the bit weight is excessive. Weight used with the smaller bits rarely exceeds 10,000 lb., although at times 15,000 lb. may be used. As the bits get larger the weight used in-

(Continued on Page 104)

Central Kansas Uplift Has Several Prolific Pays

By EDWARD A. KOESTER
Darby Petroleum Corp.

Pays in western Kansas range from the Pennsylvania to the pre-Cambrian. This article appraises possibilities of each in the light of records of older fields

THE oil and gas fields of the Central Kansas uplift are on a buried subsurface feature whose presence was not determinable prior to drilling. Like the Bend Arch district in Texas, and the Seminole uplift in Oklahoma, its location, size and shape cannot be determined by mapping surface beds. The discovery of the Fairport field in Russell County in 1923 was the first incentive to a wildcat campaign during the next few years which produced very little oil, but supplied much valuable geological information. As a result of the tests drilled in this early play the subsurface features of west-central Kansas were delineated. Core drilling, seismograph work, and surface mapping have since isolated many of the producing portions of the uplift, and for the past 3 years development of its resources has been steadily progressing despite unfavorable marketing conditions.

The Central Kansas uplift is a broadly arched feature of pre-Pennsylvanian rocks in which erosion has removed beds ranging in age from early Pennsylvanian to pre-Cambrian. The stripping off of these formations has occurred to a greater extent in some areas than in others. Over a large part of the area nothing remains under the Pennsylvanian cover but Arbuckle dolomite. Locally even this has been removed so that a basal Paleozoic sand, or pre-Cambrian granite, quartzite, or schist occurs. The porous portions of the Arbuckle dolomite exposed by this erosion serve as the principal producing horizon. In some areas a relatively thin cover of Simpson shale, dolomite and sand remains, but very little oil is produced from Simpson beds.

A wide variety of producing horizons and a varied set of oil and gas accumulations are found. In recent years the goal of most wells has been the readily acidized, porous zones in the Arbuckle dolomite which is generally the lowest producing formation. Production in the Lansing-Kansas City limestones which are locally known as the Oswald lime has also been extensively exploited. Out of 168,039,180 bbl. of production to January 1, 1940, the Arbuckle has contributed 115,627,151 bbl. (69 per cent), and the Oswald lime has supplied 32,510,023 bbl. (19 per cent). Other horizons have supplied 19,902,006 bbl. (12 per cent).

The stratigraphic section for the Central Kansas uplift as found in Ellis and Russell counties is illustrated in the left-half column of Fig. 1 with a comparison to the sequence of rocks found in McPherson and Reno counties. The latter section applies to the prolific production found along the Voshell anticline including such fields as McPherson, Johnson, Voshell, Hollow and Burrton. On Fig. 1 important oil-producing horizons are shown by large black circles, and less prolific zones by small black circles. Gas zones are shown by the conventional gas-well symbols.

Oswald Lime Production

Inasmuch as the discovery well of western Kansas, the Valerius Gas & Oil Co.'s No. 1 Oswald in Section 8-12s-15w, Russell County, found its production in the Oswald lime late in 1923, the early search in that vicinity was confined to wells projected to reach the Oswald horizon. Drilling in 1924 and 1925 failed to discover any new fields, or reveal any production below the Oswald lime, so that exploration of deeper pays was postponed for several years. Development of the Fairport field, however, showed that 10 porous, oolitic pays were present in many wells, and that each of these produced a high gravity oil at relatively slow rates, but for a long time. Water has rarely been a serious factor in the production of Oswald lime wells. In recent years acidization of these wells has met with unusual success, and potentials of 1,000 and 2,500 bbl. per day are common. The porous zones in the Oswald are lenticular and erratic. Ordinarily the best production is found in the top pay and the 30-ft. pay, but although these pays may be quite prolific in one pool, a few miles away the 75-ft. pay or the 100-ft. pay may be the best horizon. Similarly one well on a lease may be producing from the 20-ft. and 30-ft. pay while offset wells find their best production in the 45-ft. or 65-ft. zone. As a general rule high recoveries can be expected from those leases on which the pays are more consistent.

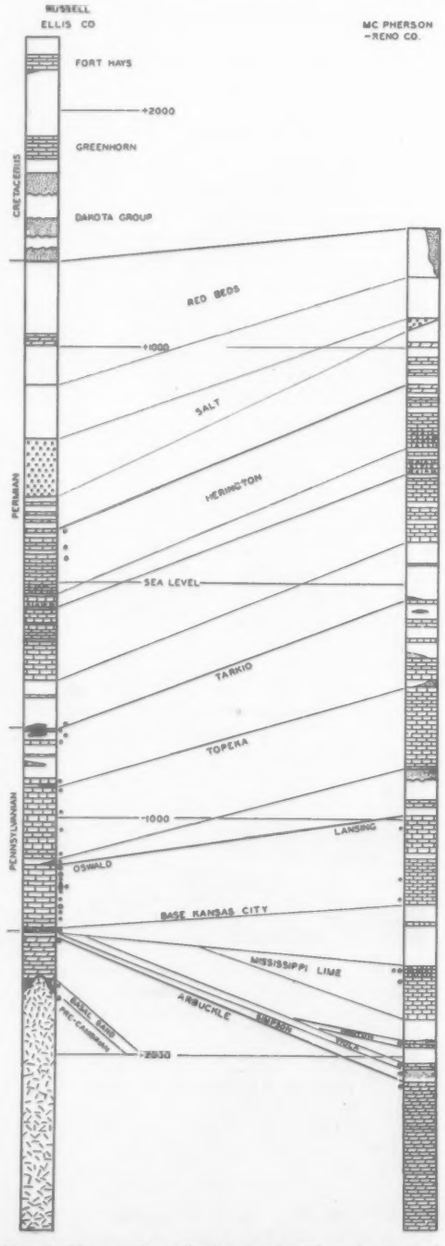


Fig. 1—Cross-section showing typical logs in Central Kansas uplift

Very little detailed information is available as to the exact thickness, porosity and permeability of Oswald pays. Many of the best pays appear to be no more than 5 ft. thick. Core analysis records are too limited to allow an even rough guess as to the porosity of Oswald pays, but porosities up to 30 and 40 per cent are indicated by some cores. The high permeability of some Oswald pays as well as the beneficial effect of acid treatment is indicated by the behavior of three wells in the Gorham field. In this instance three wells were drilled in a straight line 660 ft. apart. After the third well of the group had been acidized, both it and the other two wells, which were shut in at the time, flowed heavily for several hours.

No general estimate of recovery from the Oswald lime can be given due to the erratic nature of the producing horizon. Proration has so restricted the newer fields that producing history on them is limited. Recoveries in the Fairport field have exceeded 8,000 bbl. per acre, and this field after 15 years production was producing about 1,900 bbl. per day from 165 wells early in 1940. Many old individual leases in Russell County have exceeded 10,000 bbl. per acre, and some smaller tracts have done even more. An expectancy of 6,000 to 7,000 bbl. per acre is probably reasonable.

Broad Surface Noses

Oswald production is generally associated with a local structural high on the broadly arched Central Kansas uplift. Surface mapping of the outcropping, Cretaceous beds has resulted in the discovery of many of these local areas of production. Much of the production is found on broad surface noses, but production in known surface synclines is rare. However, some subsurface closures are known in areas that show no surface high. Geographically Oswald lime fields are widely scattered over the Central Kansas uplift. Production in some areas is so widespread that when the area is completely drilled up it will be found that present individual pools are portions of much larger producing areas. Each month brings the

joining of several pools, and although two dozen new pools were opened up in 1939 there were fewer pools actually listed at the end of the year than at the beginning. One of the richest areas of Oswald production occurs in central western Russell County. Here production extends from the Gorham pool in Township 13s-15w almost continuously in a southeasterly direction through Townships 14s-15w, 14s-14w, and 14s-13w. Although this production is known under several pool names it is practically one continuous field.

Arbuckle Dolomite Production

At present the most important producing horizon on the Central Kansas uplift is the porous, vugular upper portion of the Arbuckle dolomite of Ordovician and Cambrian age. Oil from this horizon is not quite as good as the average from the Oswald lime, although 38 and 39-gravity oil is found in several fields. In Ellis County some of the oil is as low as 25°, but there are some fields producing 43-gravity oil.

Generally the best production is found at the very top of the Arbuckle section, but in many fields profitable recoveries are obtained after penetrations of 20 and 30 ft. In the Geneseo pool of Rice County many wells have drilled into the Arbuckle 70 ft. or more, finding several zones of well saturated dolomite. An empirical rule is that high recoveries may be expected where a cover of Simpson shale occurs between the base of the Pennsylvanian conglomerate and the top of the Arbuckle dolomite.

Core analysis of Arbuckle wells has not proceeded far enough to furnish accurate samples as to average figures of porosity and permeability. In most cases the best part of the pay is lost in coring, so that the results of the analysis of recovered cores is misleading. Apparently a large part of the producing Arbuckle dolomite has porosity of 20 per cent, and no doubt individual local zones which are vugular and cavernous will exceed 50 per cent in porosity. Naturally such zones are very permeable.

Nearly all wells completed in the Arbuckle dolomite in recent years are acidized, and there has been a general increase in potentials as a result of this treatment. Shooting has been resorted to in a few wells.

Most Arbuckle dolomite producing fields have a water drive and water is associated with the oil at least in the latter stages of production. Fields having a thin zone above a high water table have yielded recoveries of 8,000 and 9,000 bbl. per acre in a relatively short time. Examples of these are the Lorraine pool of Ellsworth County, and the Ploog pool of Rice County. The Silica pool in Rice and Barton counties likewise appears to have a relatively thin yet prolific producing zone over the greater part of its area. Other pools such as the Trapp pool in Russell County, and the Bemis and Burnett pools in Ellis County have a greater producing closure and a lower water table, and recoveries from them may be expected to be considerably higher.

The Arbuckle dolomite has experienced considerable erosion and in some cases deep narrow valleys and sink holes have been carved in its upper surface. In these "sinks" an abnormally thick section of conglomerate which usually is nonproductive has filled the erosional features. For this reason several fields are spotted with inside dry holes drilled in these post-Arbuckle "sinks." No method has yet been devised to forecast the location of these "sinks."

Better Production May Be Expected

Recent careful subsurface work has indicated that better production may be expected in some portions of the Arbuckle dolomite which on the uplift may approach 800 ft. in thickness. In general it can be said that the most prolific production from the Arbuckle group is found in those areas which have the correlatives of the Cotter and Jefferson City formations of the Missouri Ozarks. Where these formations have been eroded away less prolific production may be expected.

The best indication of recovery of Arbuckle wells may be gained from such fields as the Raymond pool in Rice County which has exceeded 9,300 bbl. per acre, the Sellens and Russell pools in Russell County which have passed 7,000 bbl. per acre, and the Stratman pool of Ellsworth County which has exceeded 10,000 bbl. per acre. Proration has limited the production of many fields so much in the past 5 years that no accurate estimate can be made of average recovery. Many individual leases no doubt will produce as much as 15,000 bbl. per acre, but this is certainly well above the average. Certain old fields which did not find their production in the Cotter or Jefferson City formations of the Arbuckle group will do well to make 5,000 bbl. per acre.

In general oil production in the Arbuckle dolomite is associated directly to anticlinal structure. Certain individual tight wells which failed to produce although located structurally high seem to dispute this statement. However, their failure has been due to the character of the producing formation, low porosity, and poor permeability.

Other Producing Zones

Fig. 1 illustrates minor producing horizons close to the horizon of the Tarkio limestone. A few wells produce from the Tarkio lime, while other wells produce both oil and gas from sandstone above and below this marker. Total production from this part of the stratigraphic column is of little importance.

Likewise some oil has been found at various zones in the Topeka limestone series and the Howald lime a short distance above the top of the Topeka. Although one or two individual wells have produced remarkable amounts of oil from these zones the total production is less than one million barrels.

Ordinarily a well on the Central Kansas uplift drilling a complete section of Cambro-Ordovician rocks will find a basal sand intervening between the Arbuckle dolomite and the pre-Cambrian granite or metamorphic rocks. This basal sand and its locally reworked equivalent known as the Gorham sand has produced considerable oil in a few fields in western Kansas. The basal sand is the principal producing horizon of the Otis and Albert gas fields of Rush and Barton counties. The Gorham sand and the Arbuckle dolomite, as well as the basal sand in place, produce from several hundred wells in the Gorham field and nearby pools in Russell County. The erratic nature of the subsurface conditions in the Gorham field is shown diagrammatically in Fig. 2. On the left-hand side of the cross-section (*A*) production from the Arbuckle dolomite is shown updip from the water-bearing section, and to the right of it (*B*) production from the reworked basal sand is represented. Locally this sandy conglomerate may be found high and dry (*C*), or an isolated remanent of Arbuckle dolomite will produce as at (*D*). On the right-hand side (*E*) is shown the accumulation of oil both in the basal sand under the Arbuckle dolomite which may not produce here, and the productive portion of the Gorham sand immediately adjacent. Similar conditions are found in other fields in which erosion has irregularly stripped away the rocks below the base of the Kansas City lime, in many cases cutting down to pre-Cambrian rocks.

Minor production from pre-Cambrian granite and quartzite is known from a few scattered wells, although granite and quartzite are ordinarily too tight to contain petroleum and could not be the source beds for oil. Fractured portions of these pre-Cambrian rocks have apparently been filled with oil from the adjacent Arbuckle dolomite or Pennsylvanian beds. Naturally production from this horizon is very spotted.

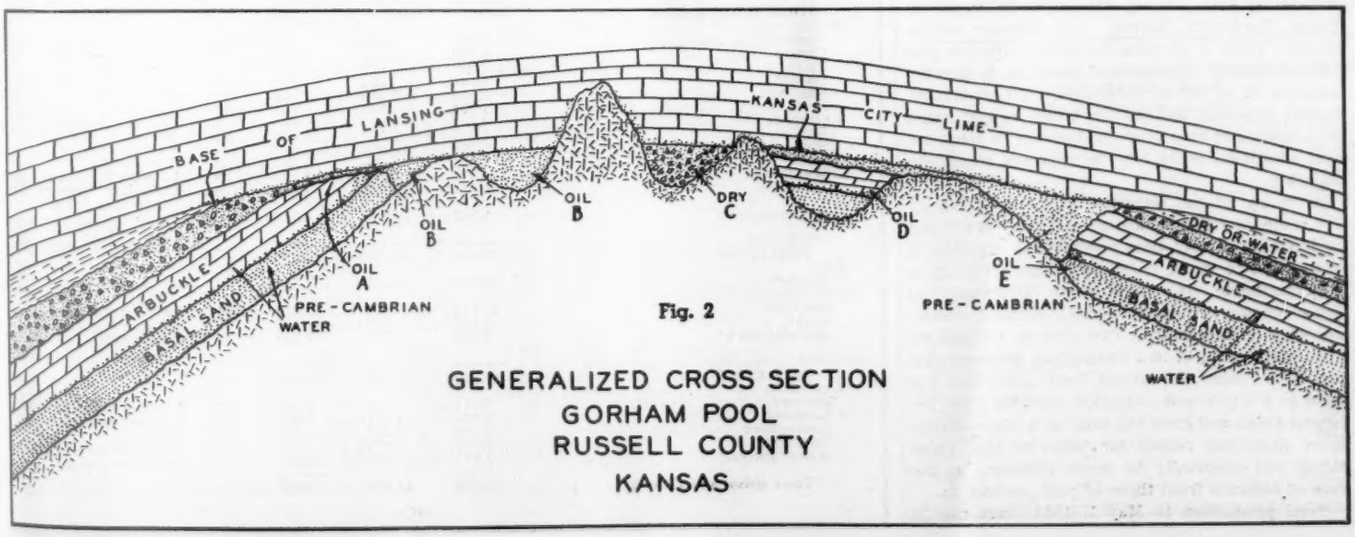


Fig. 2

GENERALIZED CROSS SECTION
GORHAM POOL
RUSSELL COUNTY
KANSAS

Kansas Oil Reserves

Than 750,000,000

ESTIMATED proven reserves in Kansas oil fields are 756,426,000 bbl. as of May 1, 1940. This represents a net gain of 22,484,000 bbl. over the estimated reserves as of January 1, 1940. If this rate of excess of discovery over production continues for the balance of the year, the estimated net gain will be 67,452,000 bbl., as compared with 88,317,000 bbl. in 1939, and Kansas' reserves will pass the 800,000,000-bbl. mark.

Detailed figures showing estimated ultimate production, past production and estimated reserves by fields are presented in Table 1. With reference to this table, certain explanations are necessary. The figures showing estimated ultimate production are based upon The Oil and Gas Journal's estimate as of January 1, 1940, together with revisions made since that time and the addition of estimated additional production due to discoveries and extensions. Wherever possible, these figures are based upon decline curves, but many fields are on proration and production statistics are of little value in determining reserves. In these cases, ultimate production has been estimated in terms of barrels per acre in the case of fully developed or outlined fields and in terms of barrels per well in newly or partially developed fields.

In many cases a number of pools have been grouped together into fields. (See Table 2). In the case of older fields, this grouping is geographic and is made necessary by the fact that production was formerly reported by districts and could not be broken down into individual pools. In newer fields, this grouping has been made because of the close proximity of pools producing from the same pays and on the same major structure. In many cases, recent drilling indicates that pools formerly regarded as separate will soon be joined and this tendency will probably increase as development continues.

The figures for past production have been subdivided as much as possible so as to allocate production to individual pools rather than to districts. This is still impossible for many pools in the eastern part of the state, notably in Greenwood County, where for years a number of pools were grouped together regardless of their geological affinities. Also, some of the production allocated to Augusta and Eldorado probably came from other pools in Butler County. Reports are particularly unsatisfactory for the eastern counties and past production for these counties was calculated on the basis of definitely allocated production, which amounted to approximately half of the total production for the area.

Miscellaneous fields in Table 1 include all those which have not produced 500,000 bbl.

In several cases, production is allocated to certain counties which actually comes from adjoining counties, when a field lies on both sides of the county line. Among the newer fields, Silica, Trapp, Bornholdt, Burrton, and Bloomer are so located. Table 3, showing estimated ultimate production, past production and reserves, is thus inaccurate in so far as these fields are concerned. It will, however, indicate the trend in production in Kansas and may serve to indicate to what extent additional pools may be expected in certain counties.

As many of the estimates of future recovery are made on fields which are not fully developed or have not at any time produced to capacity, it is difficult to make estimates whose accuracy is unquestionable. It is, however, important to know whether or not probable revisions will be upwards or downwards. One clue to further revisions is contained in a comparison between past production from the largest fields and from the state as a whole and estimated reserves from the largest fields and from the state as a whole. There is no particular reason for believing that these ratios will eventually be much different in the case of reserves from those of past production.

Total production to May 1, 1940, from the 25

Table 1—Cumulative Production and

County, Field, or district—	In thousand barrels: Estimated ultimate production	Production to May 1, 1940	Estimated reserves	Producing wells	Producing sands
Allen	13,791	11,391	2,400	...	...
Anderson	19,084	16,284	2,800	...	...
Bourbon	971	871	100	...	...
Chautauqua	37,987	29,587	8,400	...	...
Douglas-Johnson	1,016	136	880	...	...
Elk	23,685	19,125	4,560	...	...
Franklin	6,537	5,337	1,200	...	...
Labette	888	438	450	...	...
Linn	3,716	3,316	400	...	...
Lyon-Chase	6,625	5,325	1,300	...	...
Miami	13,037	10,537	2,500	...	...
Montgomery	23,586	20,786	2,800	...	...
Neodesha-Crawford	10,572	8,632	1,940	...	...
Wilson	4,344	3,444	900	...	...
Total eastern counties	*165,839	*136,287	*29,652		
*Total includes 1940 production, not allocated to counties.					
Barber	4,063	326	3,737	14	Chat, Viola, Arbuckle
Clark	458	107	351	2	Viola
Coffey	1,291	898	393	36	Peru, chat
Edwards	74	74	...	1	Basal conglomerate
Finney	373	65	308	2	Chat
Graham	821	42	789	5	Arbuckle
Kingman	5,237	2,036	3,201	41	Lansing-K.C., chat, Viola, Arbuckle
Ness	1,111	315	796	11	Fort Scott, chat
Norton	160	...	160	1	Lansing-K.C.
Pawnee	679	91	588	6	Arbuckle
Phillips	200	8	192	1	Lansing-K.C.
Pratt	1,345	55	1,290	5	Viola, Simpson
Rooks	6,516	923	5,593	37	Lansing-K.C., Arbuckle
Rush	9,092	1,701	7,391	32	Lansing-K.C., Reagan
Scott	2,323	776	1,547	8	Chat
Trego	1,642	369	1,282	15	Lansing-K.C., basal conglomerate, Arbuckle
Total misc. western counties	35,385	7,777	27,608		
Barton:					
Ainsworth	11,190	1,367	9,823	57	Topeka, Arbuckle
Beaver*	6,087	900	5,187	24	Shallow, Arbuckle, Reagan
Bloomer*	24,672	6,730	17,942	181	Lansing-K.C., conglomerate, Arbuckle
Kraft*	6,440	716	5,729	41	Arbuckle
Lantern*	4,171	492	3,679	15	Lansing-K.C., Arbuckle
Miscellaneous*	18,912	879	18,038	70	Lansing-K.C., conglomerate, Arbuckle, Reagan, Gorham
Total Barton County	71,472	11,079	60,393		
Butler:					
North Augusta	15,200	13,238	1,962	68	Lansing-K.C., Layton, Wilcox, Arbuckle
South Augusta	37,740	33,340	4,400	156	Lansing-K.C., Fort Scott, Wilcox, Arbuckle
Blankenship	7,258	6,083	1,175	91	Bartlesville
Elbing	31,197	25,327	5,870	88	Lansing-K.C., Viola
Eldorado	205,178	179,050	26,128	1,733	Lansing-K.C., Viola, Simpson, Arbuckle
Fox-Bush	14,536	13,080	1,458	172	Bartlesville
Smock-Sluss	3,567	2,986	581	43	Bartlesville, Viola
Keighley	3,687	3,103	584	52	Bartlesville
Leon-Weaver*	18,944	15,082	3,862	178	Bartlesville, chat, Viola, Wilcox, Arbuckle
Potwin	7,929	4,510	3,419	80	Lansing-K.C., chat
Douglas	1,168	875	293	21	Lansing-K.C.
Miscellaneous*	4,316	1,463	2,853	79	Lansing-K.C., Bartlesville, Burgess, chat, Viola, Wilcox
Total Butler County	350,720	298,137	52,583		
Cowley:					
Burdon	1,501	822	679	36	Bartlesville
Carson	3,592	3,011	581	18	Layton, Arbuckle
Clark	967	822	145	4	Bartlesville
David*	1,040	483	557	22	Bartlesville, Arbuckle
Eastman	3,084	2,400	684	33	Bartlesville
Falls City	1,004	859	145	13	Stalnaker
Graham	4,843	4,653	190	15	Layton, Arbuckle
Hittle	12,410	1,717	10,693	83	Stalnaker, Arbuckle
Rainbow Bend*	16,306	12,936	3,370	123	Burgess, chat
Rock*	2,875	1,492	1,383	33	Bartlesville
Weathered	4,007	1,784	2,223	28	Lansing-K.C., chat, Arbuckle
Winfield*	12,952	11,124	1,828	126	Stalnaker, Lansing-K.C., Bartlesville, Arbuckle
Miscellaneous*	9,262	2,649	6,613	116	Lansing-K.C., Elrod, Layton, Bartlesville, Burgess, chat, Fort Scott, Arbuckle
Total Cowley County	73,843	44,752	29,091		
Ellis.					
Bemis*	55,436	10,501	44,935	388	Arbuckle, Topeka, Lansing-K.C.
Burnett	22,015	802	21,213	84	Lansing-K.C., Layton
Ruder	1,068	590	478	15	Lansing-K.C., Arbuckle
Miscellaneous*	8,333	797	7,346	37	Lansing-K.C., Topeka, Wilcox, Arbuckle, conglomerate
Total Ellis County	86,852	12,690	74,162		
Ellsworth:					
Breford	3,511	951	2,560	17	Lansing-K.C., Arbuckle
Loraine	12,436	7,477	4,959	86	Lansing-K.C., Arbuckle
Stoltenberg	7,676	2,338	5,338	27	Arbuckle
Stratman	2,663	1,987	676	16	Arbuckle
Miscellaneous*	7,577	730	6,857	38	Arbuckle
Total Ellsworth County	33,863	13,578	20,285		

Estimated at More Barrels

By W. V. HOWARD

Estimated Reserves, Kansas Fields

County, Field, or district—	In thousand barrels: Estimated ultimate production	Production to May 1, 1940	Estimated reserves	Producing wells	Producing sands
Greenwood-Woodson:					
Teeter*	33,426	27,362	6,067	471	Bartlesville
Burkett-Thrall	15,896	13,716	2,180	357	Bartlesville
Polhamus	7,167	6,602	565	83	Bartlesville
Sallyards	8,469	7,007	1,462	132	Bartlesville
Virgil*	43,738	31,136	12,602	757	Bartlesville, chat
Seeley-Wick*	42,217	33,236	7,981	662	Bartlesville
Miscellaneous*	15,740	11,009	4,731	129	Bartlesville, Chat
Total Greenwood-Woodson counties	166,656	131,068	35,588		
Harvey:					
Halstead	2,039	1,187	852	20	Chat
Hollow-Nikkel	24,071	18,030	6,041	100	Lansing-K.C., chat, Hunton, Wilcox, Arbuckle
Miscellaneous	2,420	636	1,784	8	Hunton, Wilcox
Total Harvey County	28,530	19,853	8,677		
Marion:					
Florence-Urschell	16,988	16,500	488	25	Viola
Peabody	17,572	17,132	440	19	Viola
Covert-Sellers	5,120	4,535	585	14	Viola
Lost Springs	4,644	2,569	2,075	49	Chat
Hillsboro	2,429	1,697	731	41	Viola
Total Marion County	45,752	42,433	3,319		
McPherson:					
Chindberg	1,699	1,131	568	29	Lansing-K.C., chat
Graber	21,453	4,302	17,151	131	Chat, Misener, Hunton, Wilcox
Johnson	2,927	2,050	877	15	Chat
Ritz-Canton	44,666	32,351	12,315	250	Lansing-K.C., chat, Viola, Wilcox
McPherson	1,454	877	577	33	Lansing-K.C., chat, Viola
Voshell	27,682	22,605	5,077	96	Chat, Viola, Wilcox, Arbuckle
Miscellaneous*	3,121	150	2,971	11	Chat, Viola
Total McPherson County	103,002	63,466	39,536		
Reno:					
Burrton	43,033	29,052	13,981	433	Chat, Hunton, Wilcox, Arbuckle
Hilger	3,592	1,573	2,019	33	Viola
Lerado	7,623	1,927	5,696	33	Lansing-K.C., Viola
Miscellaneous*	6,420	667	5,753	29	Lansing-K.C., chat, Simpson
Total Reno County	60,688	33,219	27,449		
Rice:					
Chase*	38,462	22,473	15,989	304	Lansing-K.C., Arbuckle
Edwards	8,001	1,763	6,238	56	Arbuckle
Geneseo	27,046	4,284	22,763	145	Arbuckle
Orth	4,581	610	3,971	14	Lansing-K.C.
Raymond	7,928	5,593	2,335	32	Lansing-K.C., Arbuckle
Silica	84,618	26,314	58,304	670	Lansing-K.C., Arbuckle
Bornholdt-Welch*	24,339	4,292	20,047	107	Chat
Wherry*	36,622	5,906	30,718	206	Conglomerate
Miscellaneous*	6,790	973	5,817	35	Arbuckle
Total Rice County	238,387	72,207	166,180		
Russell:					
Atherton-Russell	8,010	4,826	3,184	58	Lansing-K.C., Arbuckle
Fairport	19,209	14,014	5,195	149	Lansing-K.C., Gorham
Gorham*	34,635	22,019	12,616	511	Lansing-K.C., Topeka, Tarkio, Arbuckle, Gorham
Gurney-Hall*	24,365	4,517	19,848	222	Lansing-K.C., Topeka, Arbuckle, Gorham, pre-Cambrian (?)
Trapp*	92,404	17,573	74,831	632	Lansing-K.C., Dodge, Topeka, conglomerate, Arbuckle
Miscellaneous*	6,248	776	5,672	17	Lansing-K.C., Tarkio, conglomerate, Arbuckle
Total Russell County	184,871	63,725	121,146		
Sedgwick:					
Eastborough	9,997	7,762	2,235	48	Chat, Viola
Goodrich	5,384	2,467	2,917	32	Lansing-K.C., chat, Viola
Greenwich	12,161	9,246	2,915	43	Chat, Viola, Wilcox
Robbins	4,179	2,816	1,363	56	Chat
Valley Center	22,835	19,640	3,195	78	Lansing-K.C., Misener, Wilcox
Miscellaneous*	1,699	1,345	354	8	Lansing-K.C., Burgess, Wilcox
Total Sedgwick County	56,255	43,276	12,979		
Stafford:					
McNaghten (St. John)	3,429	582	2,947	19	Lansing-K.C., Arbuckle
Richardson	6,872	3,621	3,251	59	Arbuckle
Zenith	14,400	2,171	12,229	185	Misener
Gates	1,490	519	971	11	Arbuckle
Miscellaneous*	12,618	750	11,862	54	Lansing-K.C., Arbuckle, Simpson
Total Stafford County	38,909	7,643	31,266		
Sumner:					
Churchill	20,146	18,206	1,940	69	Stalnaker
Oxford	16,510	14,597	1,913	67	Layton, Stalnaker, Arbuckle
Padgett	2,567	1,789	778	22	Chat
Wellington	11,004	4,188	6,816	97	Chat
Caldwell	1,883	1,303	580	4	Wilcox
Miscellaneous*	4,906	621	4,285	16	Lansing-K.C., Simpson, Wilcox
Total Sumner County	57,016	40,704	16,312		
Total Kansas	1,797,920	1,041,694	756,226		

*Contains two or more pools (see Table 2).

largest fields in the state is presented in Table 4. These fields have yielded a total of 754,366,000 bbl. or 72.4 per cent of the total past production from the state; 16 fields are not on proration, and most of these were never prorated.

Contrasted with the data presented in Table 4, Table 5 presents the estimated reserves from the 25 fields having the largest estimated reserves as of May 1, 1940. These reserves total 493,438,000 bbl., or 65.3 per cent of the total estimated reserves for the state. All but four of these fields are on proration.

Table 6 shows the estimated ultimate production from the 25 largest fields in the state. The total estimated ultimate production from these fields is 1,076,708,000 bbl., or 59.9 per cent of the total for the state.

(Continued on Page 102)

TABLE 4—TOTAL PRODUCTION FOR 25 LARGEST KANSAS FIELDS TO MAY 1, 1940

(In thousands of barrels)

Eldorado	179,050
South Augusta	33,340
Seeley-Wick	33,236
Ritz-Canton	32,351
Virgil	31,136
Burrton	29,052
Teeter	27,362
Silica	26,314
Elbing	25,327
Voshell	22,605
Chase	22,473
Gorham	22,019
Valley Center	19,640
Churchill	18,206
Hollow-Nickel	18,030
Trapp	17,573
Peabody	17,132
Florence	16,500
Leon-Weaver	15,082
Oxford	14,597
Fairport	14,014
Burkett-Thrall	13,716
North Augusta	13,238
Fox-Bush	13,080
Rainbow Bend	12,936
Total	754,366

TABLE 5—25 FIELDS HAVING LARGEST ESTIMATED RESERVES

(In thousands of barrels)

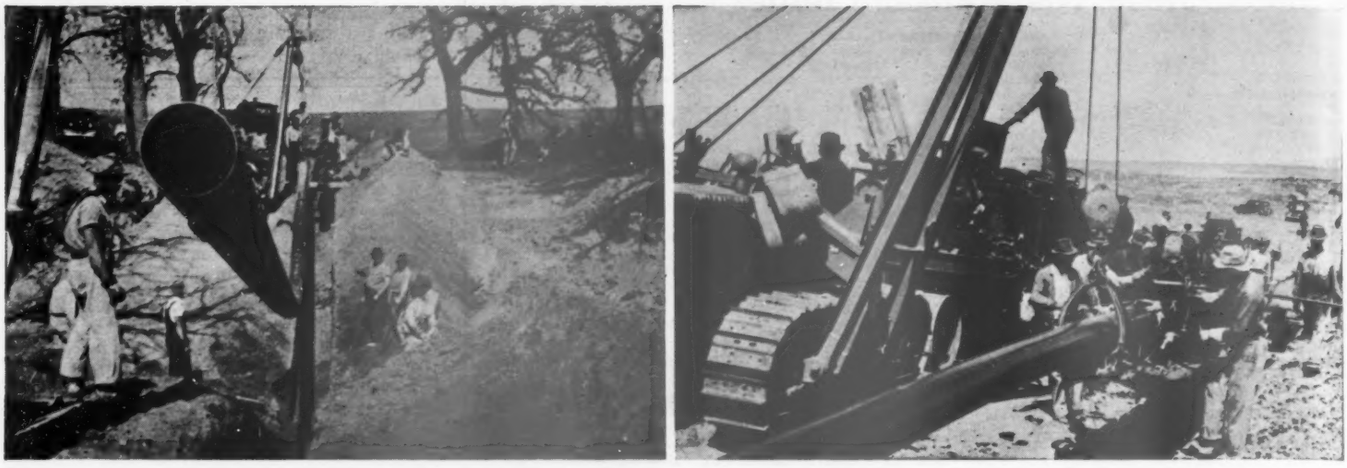
Trapp	74,831
Silica	58,304
Bemis	44,935
Wherry	30,716
Eldorado	26,128
Geneseo	22,763
Burnett	21,308
Bornholdt-Welch	20,047
Gurney-Hall	19,848
Bloomer	17,942
Graber	17,151
Chase	15,989
Burrton	13,981
Gorham	12,616
Virgil	12,602
Ritz-Canton	12,315
Zenith	12,229
Hittle	10,693
Ainsworth	9,823
Seeley-Wick	7,891
Wellington	6,814
Edwards	6,238
Teeter	6,067
Hollow-Nickel	6,041
Elbing	5,870
Total	493,438

TABLE 6—ESTIMATED ULTIMATE RECOVERY FROM 25 LARGEST FIELDS

(In thousands of barrels)

Eldorado	205,178
Trapp	92,404
Silica	84,618
Bemis	55,436
Ritz-Canton	44,666
Virgil	43,738
Burrton	43,033
Seeley-Wick	42,217
Chase	38,462
Wherry	36,622
Gorham	34,635
Teeter	33,429
South Augusta	33,240
Elbing	31,197
Voshell	27,682
Geneseo	27,046
Bloomer	24,672
Gurney-Hall	24,365
Bornholdt-Welch	24,339
Hollow-Nikkel	24,071
Valley Center	22,835
Burnett	22,015
Graber	21,453
Churchill	20,146
Fairport	19,109
Total	1,076,708

Western Kansas Being Provided With New Pipe-Line Outlet



Left: Two tractors handling pipe in constructing the new line. Right: View of pipe-coating operations

By J. CAMPBELL STIRLING
Stanolind Pipe Line Co.

WESTERN Kansas will be provided with an important outlet for its oil when the pipe line recently completed by the Stanolind Pipe Line Co. between the Bemis-Shutts pool and Washington, Kans., is put into operation. This line has a total length of approximately 134 miles; of which 127 miles is 10-in., and 7 miles is 8-in. The 10-in. pipe is A.P.I. Class B seamless, 31.44-lb. pipe with wall thickness of 0.28125 in.; random lengths of 40-45 ft. The 8-in. pipe is secondhand lapweld 28.55-lb. pipe with wall thickness of 0.322 in. reclaimed from other lines.

For the present three small semiautomatic electric-powered gathering stations of a type designated by the company as B type will pump approximately 14,000 bbl. of oil from the several fields directly to Washington station at a pressure of about 400 lb. An orifice meter is installed at the west end of the line. At the east end, where the oil is received at Washington station, the oil is measured with a displacement meter.

The country traversed by the line is rolling ground with black-clay agricultural land in the eastern part and grazing land in the western part. Two major streams, the Solomon and Republican rivers, and many creeks were crossed; also 29 roads, and 6 railroads that required casing.

An aerial survey was made of the line. Even though the ground was snow-covered, it greatly aided the ground survey which was made during the severe weather conditions in February. The north wind drifted snow into the east and west roads to depths of 6 ft. in places. Travel mostly was confined to north and south roads except along highways that were kept open by snow plows. All hubs or angle points were set and ties were made before the line was measured and the intermediate 100-ft. stakes were placed. Aerial maps were used for locating control points. Wherever practical, angle points were put on or near property lines. With the pipe line located in this manner, it will be easy for line walkers to patrol, since the fence markers will serve as guides as to the location of angle points. Options on the right-of-way were taken before the land survey was made. These options were obtained on routes selected by platting the line on an aerial survey map.

Construction of the line was divided into four jobs. Job 1 was from Bemis to the Solomon River near Beloit. Job 2 was from Solomon River to Washington. Job 3 was the Solomon River. Job 4 was the Republican River crossing. Job 4, the Republican River crossing, was laid by C. S. Foreman Co. This work was started March 21 in advance of other operations and was completed April 1. The laying of pipe for Job 1 started March 25 and completed June 12. This was handled by Gordon Construction Co. and Fredel Construction Co. Job 2 was constructed by O. C. Whitaker Co. and Brown & Root, Inc., between March 23 and May 19, with an average footage of 5,554 ft. laid per working day. The bridge across Solomon River was erected by Stanolind Pipe Line Co. Each contractor employed one crew. All stringing was done by J. R. Vandaveer.

The line was laid in a ditch 22 in. wide for 8-in. pipe and 24 in. wide for 10-in. pipe; there is 20-in. covering over the pipe. Contractors on Jobs 1 and 2 used one small and one large ditcher. A trench hoe was used on Job 2 for preparing the right-of-way. Fredel used a rooter in rocky sections. Pipe was bent ahead of the laying crew on

Map of recently completed line between the Bemis-Shutts pool and Washington, Kans.

Job 2 while on Job 1 the pipe was bent as it was laid.

Each of the contractors on Jobs 1 and 2 employed the stovepipe method of construction. All of the line was electric welded with four beads. The first or stringer bead was made with a 5/32-in. rod; the remaining three beads were usually made with $\frac{1}{4}$-in. rod. Two welders were used on Job 2 for making stringer beads, while four welders were used on Job 1 for making stringer beads. Both contractors used two tractors with each pipe-laying crew.

The crossing of the Republican River was made at a point where the distance across the river bed was 300 ft. and the banks were 8 ft. high. The land on both sides of the river is sandy and is occasionally inundated. Sand bags were placed where the banks were broken to prevent washing out during period of high water. At the approaches to the river the ditch was 14 ft. deep. The extra deep ditch was a precautionary step taken to prevent washing out of the pipe line. River pipe used in the river crossing and approaches was 10-in., 54.73-lb., ½-in. wall thickness. Twenty-five sets of river clamps weighing 1,278 lb. per set were used on the Republican River. Pipe was made up on the banks and pulled across the river with the use of cables and blocks. After the pipe line was pulled across the river, it was ditched and lowered by means of a Swenson dredge mounted on steel barges.

Solomon River was crossed by the pipe line on a suspension-type bridge with a 300-ft. span. The distance across the river channel is 100 ft. Bridging at this point was done because the river water is salty and contaminated with sewage and because of steep unstable banks. On the bridge is a walkway for the linewalker and other company employes.

Cleaning machines were run over the line ahead of the equipment that applied the asphalt-primer coat. As soon as the primer had cured an application of 5/32-in. of Parolite (a petroleum asphalt) and a wrapper of 15-lb. asbestos felt was machine applied. The pipe line, excepting the Solomon and Republican river crossings, was coated and wrapped throughout its entire length.

A feature of the coating operations on Job 1 was the use of a 32-drum kettle. The kettle was divided into two compartments and mounted on traction crawlers. With this large kettle, it is possible to break up the asphalt on the truck, used for transporting it to the line, and load direct from truck to kettle, thus decreasing the loss of material along the right-of-way. The large kettle had been found satisfactory on previous jobs and the melting capacity of the kettle was sufficient to provide material continuously for the coating of 8-in. pipe. However, the capacity was found to be too small for 10-in. pipe and time was lost due to waiting for asphalt to melt. When crossing over very rough country, it is doubtful if the use of a 32-drum kettle would be practicable.

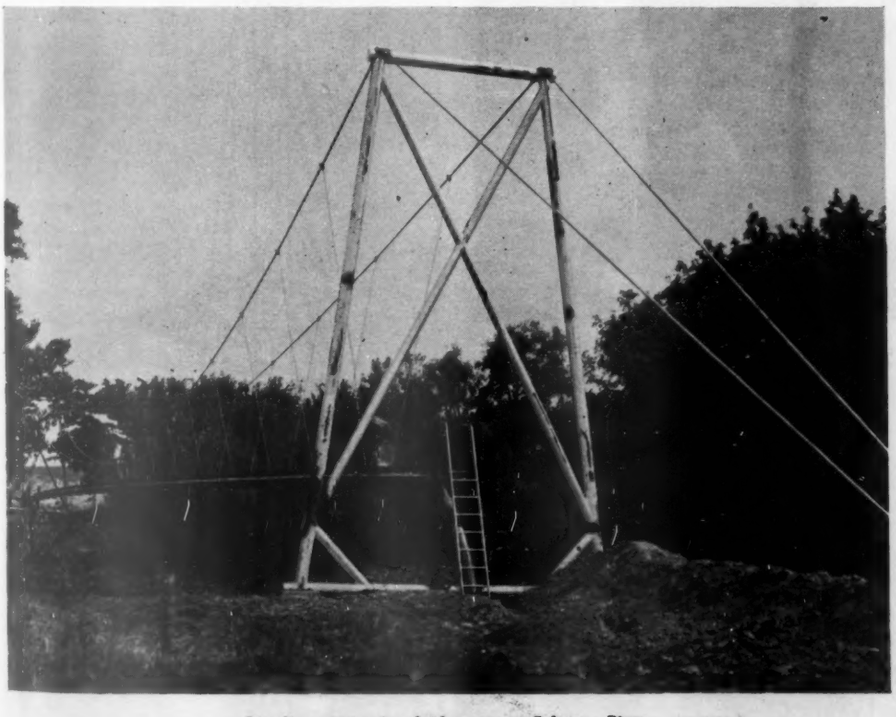
Large asphalt kettle, water-tank wagon and trailer used in coating

Spray for cooling pipe after coating and wrapping

An innovation introduced in the coating operations was the use of a shower bath for cooling the coating. This operation consisted of spraying the coating with water coming through pin-hole perforations about 2 in. apart in a circular nozzle of ½-in. pipe around the pipe line. A garden hose connected the nozzle with a water tank. Water was expelled from the tank by 10-lb. air pressure applied to the tank by a compressor. The cooling was sufficient to lower the temperature of the coating to a point where the coating was firm enough to support the weight of the pipe when it was lowered into the ditch. If the coating is not cooled, the weight of the pipe tends to squeeze the coating thin wherever the coated pipe is supported. An average of 500 gal. of water was used per mile. All of the pipe line, except slack loops, was lowered into the ditch when coated. The slack loops were whitewashed with a mixture of lime and water to reduce the effects of the sun's rays. When exposed to extremely hot sun rays there is sometimes a difference of 30° F. between the heat absorption of black and white.

Normally, 16 slack loops were placed in the pipe line per mile through level country and 12 loops per mile through rough country.

An air-driven swab was run through the pipe line to remove debris, slag, and other foreign material. The swab was constructed with the disk ½ in. less than inside diameter of pipe and large enough to lodge on buckles, icicles, or flattened places in the pipe line. So, if the swab passed through the pipe line, one was quite sure the line was free of all foreign matter and obstructions that might stop a scraper. Usually the air-driven swab was run daily. However, in some cases, it was desirable that the swab be run less frequently. Stanolind had no objections if the swab was not run daily, as the responsibility for a clean pipe line with no obstructions rested with the contractor. After each contractor finished his loop it was tested for 48 hours with 100 lb. air pressure.



Pipe-line suspension bridge across Solomon River

Economies of Slim-Hole Drilling Attract Operators' Attention

By F. W. HEISER
Petroleum Engineer, Derby Oil Co.

KANSAS operators are showing an increased interest in slim-hole drilling, using lightweight drilling equipment and casing. In analyzing the factors giving impetus to this method of drilling we find three of greatest importance: First, the decline in the daily production allowable of prorated wells has made it essential that operators cut down the cost of drilling and equipping their wells in order to expedite returns on investment; second, unproved or semiproved leases or acreage with low recoverable reserves, which would not be commercially attractive at usual development costs, can be explored and developed at a reasonable cost by using these small rotary units; and third, adoption of the draw-down method of taking potentials permits the use of smaller and lighter pumping equipment.

First, let us define slim-hole drilling. The term as used in this discussion will mean the drilling of a small diameter hole for producing through 5½ in. or smaller casing. The tendency in Kansas is definitely toward a 6¼-in. hole for 4½-in. o.d. casing. It means the use of a slim-hole rig, which is a unit carrying its own derrick, draw works, rotary table, power, and pumps all unitized on: (*a*) a truck; (*b*) one large skid; or (*c*) a few small skids. The derrick is a material part of the unit and it is essential that it be readily transportable.

The principles involved in slim-hole drilling are not new. The practice has been followed in the Gulf Coast and California areas, and on many other deep completions and exploratory tests for several years. It is the use of the lightweight slim-hole rigs for routine relatively shallow production drilling that is a recent innovation in drilling practice in Kansas.

In the State of Kansas, a large-scale drilling campaign that reached its peak in 1937 automatically caused a great reduction in the allowable production per well which is prolonging the payout of well investments to as much as 10 years in some cases. In 1935 the average per well allowable was established at 60 bbl. daily; in 1937 it had dropped to 40 bbl. daily; in 1939 it declined to 24 bbl. and now has reached a new low of 20 bbl. per prorated well. With allowables dropping, Kansas operators found themselves in a discouraging situation. They found that, if they were going to make any profit, it would be imperative to find a way to reduce the cost of drilling and equipping wells. Oil companies, equipment companies and contractors set out to see what could be done to accomplish this. In analyzing the situation they realized three major considerations where savings might be effected. They were:

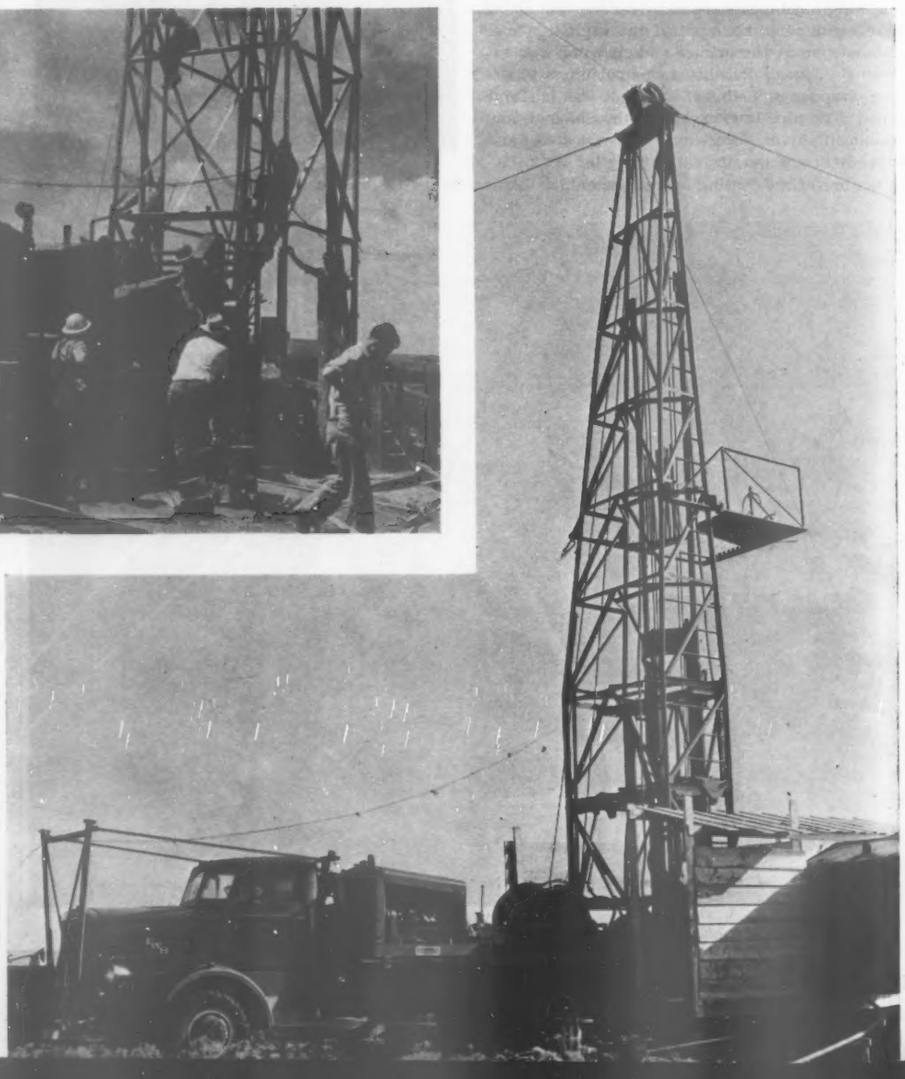
1. A saving in the cost per-foot-of-hole for drilling the well.
2. A saving in casing cost by reduction in size and weight.
3. A saving in the cost of pumping equipment.

Since inauguration of the rotary the general trend in its design has been toward larger, heavier and stronger parts until, in 1930, it had reached enormous size and weight. In contrast with this trend, during the past few years, more study has been devoted to a decrease in size and weight and an increase in portability of equipment, than to any other single phase of development.

Development of Slim-Hole Rig

Previous to this time there had been several developments which had a very important place in the evolution of the slim-hole rig. The conventional portable core-drill units for drilling relatively shallow test holes had been developed into a machine designed for deeper drilling in waterflooding and repressuring projects. The success in securing lower costs with these improved core-drill units prompted certain operators and equipment manufacturers in Kansas and other parts of the Mid-Continent area to experiment further with the utilization of these machines for drilling smaller holes to the deeper pay horizons of Kansas.

Another element which was having its influence on the future of slim-hole drilling was that opera-



Above: Rigging up on a trailer-mounted rig using a sectional mast. Right: Truck-mounted slim-hole rig with a unitized open-face mast

tors on the Gulf Coast were drilling slim holes and producing successfully from small pipe. This practice arose because, in the bottom sections of the deep wells, operators ran out of hole and found it necessary to improve methods of producing through smaller pipe.

Improved Small Bits

Other metallurgical and mechanical improvements in equipment also had their place in the advent of slim-hole drilling. Among these were the development of satisfactory small-size rock bits and the improvement of small-size drill pipe; particularly, 3½-in. pipe, permitting the use of lighter draw works. The modern small-size rock bit has proven itself capable of giving service in hard formations which compares favorably with that given by larger sizes.

The truck-type portable rotary-drilling unit is an outgrowth of the small coring machine. The larger of these units may be used to drill 7⅞-in. holes to a depth of 5,000 ft. The word "portable" when applied to these units is no misnomer. All equipment necessary, excepting drill pipe, casing, fuel and water is mounted on a suitable truck. The 58-ft. open-faced derrick mast, when erected by a special raising device, stands at the rear of the truck to which it is hinged. The derrick is folded back over the truck and truck cab for moving. Rigging up and tearing down are confined to the operation of a few controls to raise and lower the derrick. Generally, two 4½ in. by 8 in. mud pumps are mounted behind the truck cab. Two six-cylinder 125-hp. engines are used for power, the truck engine and an auxiliary engine mounted alongside the pumps. In normal drilling the truck engine drives the rotary table and the auxiliary engine powers the mud pumps. It is possible to reverse this arrangement, or to use either engine to drive the pumps and rotary table simultaneously. When additional power is necessary, as for coming out of the hole, the engines may be compounded. The draw works is located at the rear of the truck. All operations are controlled from the driller's stand on the derrick floor.

Another type of portable rotary which has been developed for slim-hole drilling is the single-skid rotary. The entire rig including the derrick, rotary table, draw works, transmission, two motors, and slush pumps, is unitized on a single skid. The unit, being less than 8 ft. wide, requires no special permit for transportation on the highways. The 85-ft. derrick mast, adapted to pulling "doubles," has a self-contained boom-raising device. The derrick is constructed in two sections for portability; about an hour's time is required for assembling and raising into position.

The third type of unit which can be classed as a slim-hole rig, although it is capable of drilling larger and deeper holes than are necessary for slim-hole drilling in Kansas, is a small-size conventional rotary rig having a derrick which is assembled on the ground and raised as a unit. The rotary table, draw works, motors, and slush pumps are mounted on a minimum number of skids to make them readily portable. A newly developed 87-ft. derrick mast is the interesting part of this type of rig. The derrick is made up of five sections with each section so fabricated that the structure can be completely assembled and the blocks strung up in a horizontal position on the ground. Three sections of approximately equal length make up the 87-ft. height. The lower section is divided into two parts; one part, being stationary, is erected over the draw works and acts as a gin pole in the raising operation, the other part is a portion of the movable part of the derrick. The fifth part of the derrick is the base to which the foot of the derrick is pivoted. For raising into position, the drilling line is taken over the sheave on the gin pole, then through the crown blocks and strung up as for drilling. The dead end of the line is fastened to the base. The traveling block is held by a line connecting it to the top of the gin pole. By spooling the drilling line the derrick is brought into an upright position and is then bolted in place to the bottom stationary section. The time required for erection is approximately 5 hours.

Use Various Fuels

Diesel fuel, natural gas and butane are the most popular fuels used on the slim-hole rigs. Water requirements are low for each type.

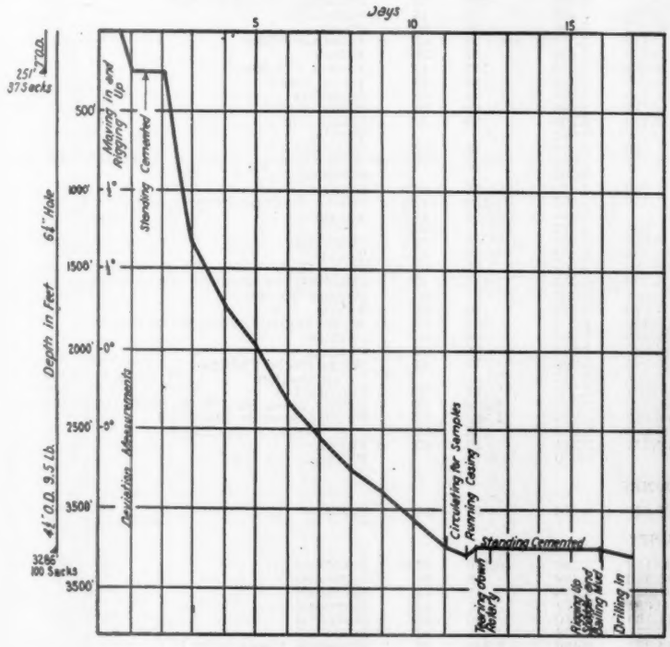
No attempt will be made to discuss the relative merits of each type of rig as existing conditions will govern the selection of the type of unit.

Each rig is designed specifically for effecting savings in drilling. There are several features of the slim-hole rigs which are instrumental in accomplishing these savings: Their high degree of portability allows them to be moved from location to location in a minimum amount of time and at minimum expense. Cost of the individual well derrick is eliminated by the self-contained derrick of the unit. Rigging up and tearing down time is greatly reduced. On some of the rigs a saving in labor is effected by use of a 3-man crew. Reduction in size of the rigs has made for reduced fuel and water requirements.

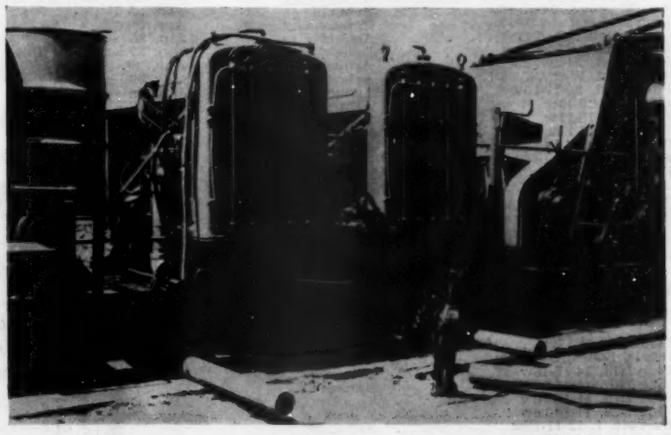
Slim-hole drilling has enabled operators, who are contracting their wells, to realize a saving in actual drilling cost of from $3,000 to $4,000 per well over the cost of conventional methods. It is believed that some major companies operating their own slim-hole rigs are effecting much greater savings than these.

Typical Drilling Record

The drilling record of a typical Kansas slim-hole well is presented to show the speed of drilling and other information of interest. From this can be seen the savings to be effected by the short time required for rigging up and tearing down. Rigging up on this particular well required 16 hours. The actual drilling time of 10 days compares favorably with the average time required by conventional medium-sized rotaries. Twelve hours were required to tear down and move the rig on to a nearby location. When coring of the producing horizon is necessary, drilling time will be extended. Past experience has shown that the slim-hole rigs in use in Kansas at the present time are capable of drilling an average of two wells per month.



Left: Drilling curve on skid-type slim-hole rig shows minimum moving time required. Below: Slim-hole rig which uses several skids and a mast which must be assembled on the job



Casing Cost

Casing cost is a major item to be considered in reducing the cost of a well. By reduction of casing size from 7 to 4½ in., Kansas operators have effected savings amounting to over 50 per cent of the cost of the 7-in. pipe or a saving of from $2,000 to $2,500 per well. The small-size casing has no advantages other than the reduction in cost; on the contrary, it has presented additional problems when it has been necessary to go deeper after the slim-hole casing has been set. If, at a later date in the life of a well, it is found that it is necessary to handle volumes of fluid greater than a 2-in. tubing is capable of handling, it will be necessary to use a casing pump to take care of this increased volume of fluid. The fear that rod cutting may cause failure of the small-size casing does not appear to be important, providing the holes are drilled reasonably straight. Substantiating this belief is the fact that no appreciable wear has been experienced in the use of ⅞-in. rods in 3-lb. tubing in straight holes. Danger of failure due to outside corrosion also appears to be slight. In the areas of Kansas where corrosive water is encountered in the Dakota sand, the accepted practice is to set

(Continued on Page 60)

Kansas Operations by Fields

Pool name and location (S.-T.-R.)—	Prod. formation	Disc. date	No wells 5-1-40	Total prod. to May 1, 1940	Ave. pay depth	Dly. ave. prod. Apr. '40	Ave. grav.	Purchasing companies
BARBER COUNTY								
Lake City, 18-31-13w	Arbuckle	Sept. '38	1	20,334	4,607	40	43	White Eagle
Lake City, 7-31-13w	Viola	May '37	1	13,890	4,434			
Medicine Lodge, 15-33-13w	Chat	Mar. '37	2	34,038	4,845	35	33.4	Skelly
Whelan, 32-31-11w	Chat	Aug. '34	11	258,536	4,325	204	27	Skelly
BARTON COUNTY								
Ainsworth, 33-16-13w	Arbuckle	Dec. '36	56	1,377,607	3,380	1,195	36	Continental, Phillips, Texas, White Eagle
Ainsworth, 35-16-13w	Topeka	Jan. '39	1	9,711	2,925	18	35	Continental
Albert, 30-18-15w	Reagan	Feb. '35	13	489,837	3,520	215	35	Bay, Globe
Beaver, 16-16-12w	Gorham	Dec. '34	19	715,547	3,314	404	39	Stanolind
Beaver, North, 4-16-12w	Arbuckle, Gorham	Oct. '37	3	168,588	3,320	130	39	Texas
Beaver, Shallow, 8-16-12w	Topeka	Apr. '39	2	21,894	2,906	57	36.8	Stanolind
Bloomer, 36-17-11w	Arbuckle	Feb. '36	127	4,054,549	3,285	2,633	44	Cities Service, Skelly, Texas, Phillips, W. E.
Bloomer, 36-17-11w	Kansas City	Apr. '37	32	802,148	3,044	763	44	Phillips, Skelly, Texas
Clawson, 17-20-11w	Arbuckle	Dec. '38	6	126,830	3,300	88	41	Texas, White Eagle
Davidson, 4-16-11w	Arbuckle	Mar. '30	2	42,003	3,310	41	38	Texas
Eberhardt, 14-19-11w	Arbuckle	June '36	4	138,664	3,309	59	39	Stanolind
Ellinwood, 9-20-11w	Arbuckle	July '32	25	1,526,671	3,305	398	43	Stanolind, Texas, Phillips
Ellinwood, North, 33-19-11w	Arbuckle	June '37	1	34,695	3,328	19	43	Stanolind
Ellinwood, West, 7-20-11w	Arbuckle	Apr. '38	4	62,915	3,346	56	40	Falcon
Ernsting, 1-20-12w	Arbuckle	Feb. '40	2	1,717	3,370	38	42	Falcon, Phillips
Feist, 29-18-11w	Arbuckle	Oct. '35	1	43,419	3,430	17	38	Falcon
Feltes, 14-16-12w	Arbuckle	Nov. '39	4	14,378	3,345	179	43	Falcon, Phillips
Hagan, 29-20-11w	Arbuckle	Dec. '38	1	10,600	3,323	18	40	White Eagle
Hiss, 31-20-13w	Kansas City	Apr. '36	4	223,248	3,205	84	38	Stanolind
Hoisington, 21-17-13w	Arbuckle	June '38	2	17,519	3,440	80	39	White Eagle
Hoisington, 21-17-13w	Kansas City	Jan. '38	1	23,754	3,260	19	39	White Eagle
Hoffman, 18-16-11w	Arbuckle	May '40	1	.....	3,317	.....	..	Phillips
Knop, 6-20-11w	Arbuckle	Feb. '40	1	570	3,345	19	42	Stanolind
Kraft, 10-17-11w	Arbuckle	May '37	40	716,143	3,280	745	43	W. E., Phillips, Texas, C, S., H. & T. Ref. Co.
Kraft, North, 34-16-11w	Arbuckle	Apr. '40	1	.....	3,395	.....	..	[illegible]
Krier, 33-16-11w	Arbuckle	Nov. '39	2	1,509	3,350	50	42.5	Phillips
Krier, 30-16-11w	Gorham	Nov. '39	5	21,776	3,307	183	42.5	Falcon, Phillips, Derby
Krier, 30-16-11w	Kansas City	Apr. '40	1	.....	3,030	7	42.5	Falcon
Kruckenberg, 14-19-15w	Arbuckle	Feb. '39	....	965	3,632	.....	32.7	
Kruckenberg, 14-19-15w	Kansas City	Apr. '39	1	6,019	3,400	8	32.7	Stanolind
Lanterman, 15-19-11w	Arbuckle	Jan. '35	2	74,808	3,332	36	42	Texas
Lanterman, 22-19-11w	Kansas City	May '37	4	99,116	3,109	60	42	White Eagle, Cities Service, Texas
Marchand, 24-20-12w	Arbuckle	Apr. '39	5	54,778	3,316	145	40	Cities Service, Phillips, White Eagle
Marchand, West, 23-20-12w	Arbuckle	May '39	4	29,804	3,330	91	40	Phillips, Falcon
Pospishell, 20-17-15w	Arbuckle	July '39	2	7,070	3,570	16	38	Falcon
Prusa, 20-16-11w	Arbuckle	Dec. '38	21	165,150	3,252	544	43	White Eagle, Phillips, Cities Service
Prusa, 20-16-11w	Reagan	May '39	2	22,010	3,304	40	43	Phillips
Prusa, 17-16-11w	Kansas City	June '39	2	14,990	3,260	55	43	Phillips
Prusa, West, 15-16-11w	Arbuckle	Sept. '39	4	20,743	3,828	70	43	White Eagle, Phillips
Prusa, West, 17-16-11w	Kansas City	July '39	....	3,885	3,217	.....		No connection
Rick, 1-19-11w	Arbuckle	Aug. '36	5	180,004	3,350	87	36	Stanolind
Silica, 31-19-10w	Arbuckle	Feb. '35	528	21,396,213	3,315	8,208	42	Falcon, Stan., Sin., W. E., Skelly, C. S., Phillips
Silica, South, 24-20-11w	Arbuckle	Oct. '35	91	2,685,912	3,275	1,589	42	Phillips, Sinclair, Stanolind
Susank, 16-16-13w	Arbuckle	Dec. '36	8	247,693	3,395	105	38	C. S., Texas, White Eagle
Wolf, 36-19-12w	Kansas City	Aug. '38	1	24,771	3,374	19	40	Falcon
Wondra, 15-17-12w	Kansas City	Mar. '40	1	.....	3,050	.....	..	Phillips
CLARK COUNTY								
Morrison, 17-32-21w	Viola	Nov. '36	2	98,851	6,456	57	28	Skelly
ELLIS COUNTY								
Bemis, 16-11-17w	Arbuckle	Oct. '35	289	6,849,123	3,380	6,436	34.6	Stanolind
Bemis, South, 2-12-17w	Arbuckle	Dec. '38	1	11,486	3,360	18	31	Stanolind
Blue Hill, 14-12-16w	Arbuckle	July '37	1	21,932	3,358	11	42	Stanolind
Blue Hill, 11-12-16w	Kansas City	Oct. '37	6	60,681	3,072	141	42	Stanolind
Blue Hill, 11-12-16w	Topeka	Mar. '39	2	11,169	2,810	40	42	Stanolind
Blue Hill, 11-12-16w	Wilcox	Aug. '38	1	6,771	3,358	11	42	Stanolind
Burnett, 1, 12-11-18w	Arbuckle	Oct. '37	94	794,338	3,490	5,340	32	Stanolind, Cooperative P. L.
Burnett, 12-11-18w	Kansas City	Nov. '39	2	7,715	3,358	40	32	Stanolind
Catherine, 3-13-17w	Kansas City	June '37	3	99,063	3,360	37	34	Stanolind
Cress, 13-11-17w	Arbuckle	Jan. '37	27	662,881	3,295	524	34	Stanolind
Emmeran, 4-13-16w	Kansas City	June '37	1	31,462	3,260	16	41	White Eagle
Koblitz, 23-12-18w	Arbuckle	May '37	4	3,904	3,673	36	26	Texas
Krause, 22-14-19w	Gorham	Sept. '36	2	49,319	3,735	21	35	White Eagle, Texas
Marshall, 36-11-18w	Arbuckle	Nov. '36	14	410,007	3,645	256	29	Stanolind
Penny Wann, 13-15-20w	Basal	Sept. '36	1	21,704	3,653	18	31	Phillips
Richards, 5-11-18w	Kansas City	Dec. '37	2	58,245	3,367	36	36.8	Stanolind
Ruder, 17-15-18w	K.C., Arbuckle	Aug. '35	10	589,147	3,280, 3,560	200	36	Phillips, Cities Service, Texas
Shutts, 5-12-17w	K.C., Arbuckle	Nov. '38	23	1,862,760	3,280	401	33.5	Stanolind
Solomon, 28-11-19w	Arbuckle	Jan. '36	3	32,782	3,635	15	21	Drillers Gas Co.
Toulon, 3-14-17w	Arbuckle	Dec. '35	5	129,317	3,560	88	33	Texas, White Eagle
Ubert, 12-13-18w	Arbuckle	Nov. '36	4	106,724	3,635	60	22	White Eagle, Vickers, Texas
Walters, 11-12-18w	Arbuckle	May '36	38	684,259	3,614	806	35	Stanolind
Walters, 2-12-18w	Topeka	Mar. '36	1	55,527	3,060	16	40	Stanolind
Windholz, 2-13-16w	Arbuckle	Mar. '38	1	588	3,242	.....	..	No connection
ELLSWORTH COUNTY								
Breford, 18-17-10w	Arbuckle	July '36	6	208,225	3,370	116	45	White Eagle
Breford, 7-17-10w	Kansas City	Sept. '36	11	756,687	3,140	172	45	White Eagle, Cities Service
Ehler, 35-16-10w	Arbuckle	Mar. '40	1	606	3,297	.....	42	Falcon
Lorraine, 14-17-9w	Arbuckle	Nov. '34	63	7,359,648	3,200	1,462	46	Phillips, White Eagle, Skelly, Cities Service
Lorraine, 14-17-9w	Kansas City	Sept. '36	23	116,969	2,850	150	46	White Eagle, Skelly, Texas, Cities Service
Heiken, 25-17-10w	Arbuckle	Oct. '30	3	337,287	3,230	30	46	Phillips
Stoltenberg, 21-16-10w	Arbuckle	June '31	34	2,327,762	3,360	575	42	Stanolind
Stratman, 1, 12-17-10w	Arbuckle	Mar. '31	17	1,987,239	3,260	192	43	Stanolind
Wilkins, 13-17-10w	Arbuckle	Apr. '34	25	453,044	3,275	766	41	Cities Service, White Eagle, Phillips
Wilkins, North, 13-17-10w	Arbuckle	Aug. '39	1	4,620	3,262	17	41	Phillips
FINNEY COUNTY								
Nunn, 27-21-34w	Mississippi	June '38	2	65,255	4,640	.....	32	Atlantic
GRAHAM COUNTY								
Morel, 15-9-21w	Arbuckle	Apr. '38	5	40,777	3,720	385	28	Atlantic
HARVEY COUNTY								
Halstead, 36-22-2w	Chat	Apr. '30	20	1,211,652	2,940	341	35	Shell, White Eagle
Hollow-Nikkel, T. 21, 22-3w	Chat, Hunton	Dec. '31	97	17,954,971	3,300	1,156	40	White Eagle, Sinclair, Skelly, Derby, Globe
Sperling, 14, 23-22-2w	Hunton	Jan. '35	7	263,429	3,300	116	35	Derby, White Eagle
KINGMAN COUNTY								
Cunningham, 30-27-10w	Kansas City	Jan. '31	41	2,010,845	3,390, 3,409	604	41	Skelly

Note: This report is confined to prorated pools.

Pool name and location (S.-T.-R.)—	Prod. formation	Disc. date	No wells 5-1-40	Total prod. to May 1, 1940	Ave. pay depth	Dly. ave. prod. Apr. '40	Ave. grav.	Purchasing companies
MARION COUNTY								
Hillsboro, 7-19-3e	Viola	Oct. '28	12	1,727,436	....	153	31	Sinclair Prairie
McPHERSON COUNTY								
Bornholdt, 30-20-5w	Chat	July '37	58	185,490	3,300	1,117	40	Continental, Sinclair
Canton, North, 26-18-1w	Chat	July '36	1	53,659	2,803	19	36	Globe
Chindberg, 13-19-3w	Chat, Kansas City	Sept. '32	26	1,118,116	2,380, 2,900	226	37	Globe, Bay
Graber, 16-21-1w	Chat	Sept. '37	3	29,314	.....	.....	41	Derby
Graber, 29-21-1w	Hunton	May '34	125	4,261,068	3,275	2,577	41	Continental, Derby, White Eagle
Graber, 16-21-1w	Misener	May '37	2	45,709	3,325	14	41	Derby
Johnson, 35-19-3w	Chat	Feb. '32	15	2,082,111	2,380, 2,978	207	36	Globe, Bay
Lindsborg, 8-17-3w	Viola	Jan. '38	2	28,572	3,360	94	35	Globe
McPherson, 31-18-2w	Chat	Mar. 28	21	853,391	2,950	166	38	Bay
Ritz-Canton, T. 19, 20, R. 1, 2w	Chat, Viola, Wilcox	July '29	243	32,523,476	2,875, 3,350	4,039	36	Globe, White Eagle, Sinclair, Skelly, Bay
Roxbury, 18-17-1w	Chat	Nov. '36	10	76,516	2,685	143	35	Bay
Voshell, T. 20, 21-3w	Viola, Wilcox	Aug. '29	94	22,516,278	3,100, 3,600	1,282	41	White Eagle, Skelly, Sinclair, Derby
NESS COUNTY								
Aldrich, 7-18-25w	Viola	Oct. '29	11	176,759	4,350	432	35	Atlantic
PAWNEE COUNTY								
Pawnee Rock, 13-20-16w	Arbuckle	Sept. '36	6	95,704	3,820	98	36	Stanolind, Falcon
PHILLIPS COUNTY								
Bow Creek, 36-5-18w	Kansas City	June '39	1	8,067	3,160	25	..	Cooperative P. L.
PRATT COUNTY								
Cairo, 7-28-11w	Viola	Dec. '39	1	1,105	4,280	14	38-40	Skelly
Iuka, 11-27-13w	Simpson	Oct. '37	4	52,510	4,297	56	38	Skelly
RENO COUNTY								
Abbyville, 24-24-8w	Kansas City, Viola	Jan. '27	4	362,269	3,540, 3,588	70	38	Skelly
Buhler, 25-22-5w	Simpson	Apr. '38	10	257,669	3,900	251	38.5	Derby
Burrton, 11-23-4w	Arbuckle	Jan. '35	2	80,015	3,775	17	42	Sinclair
Burrton, T. 23, 24, R. 3, 4w	Chat	Feb. '31	344	16,680,032	3,266	5,429	42	Skelly, Sinclair, Shell, White Eagle, Derby
Burrton, T. 23, 24, R. 3, 4w	Hunton	Feb. '31	87	12,145,710	3,585	1,396	42	Skelly, Sinclair, Derby, Shell, White Eagle
Burrton, 14-23-4w	Wilcox	July '38	1	8,055	3,727	.....	42	Shell
Hilger, 16-26-4w	Viola	Mar. '34	33	1,590,495	4,035	647	38	Stanolind
Lerado, 22-26-9w	Kansas City	June '38	1	12,814	3,535	18	36	Skelly
Lerado, 11-26-9w	Viola	Dec. '35	32	1,925,796	4,135	490	36	Skelly
Yoder, 27-24-5w	Chat	Nov. '35	6	65,733	3,402, 3,500	.....	37	Derby
RICE COUNTY								
Bloomer, 19-17-10w	Conglomerate	Sept. '39	1	4,403	3,281	18	44	Skelly
Brandenstein, 10-19-10w	Kansas City	Nov. '33	2	350,403	3,025	42	40	Stanolind
Bredfeldt, West, 12-16-10w	Arbuckle	Dec. '39	1	3,673	3,268	32	40	Falcon
Campbell, 28-19-9w	Arbuckle	Jan. '38	21	569,422	3,195	443	44	Cities Service, Skelly, Phillips, Falcon, W. E.
Chase, 32-19-9w	Arbuckle	Mar. '31	238	19,167,318	3,246	3,910	40	Sinclair, Phillips, Falcon, C. S., W. E., Skelly
Chase, 15-19-9w	Kansas City	July '38	1	22,035	2,962	7	40	Sinclair
Cramm, 15-19-9w	Kansas City	July '37	4	79,218	3,074	85	40	Phillips, White Eagle
Doran, 13-19-10w	Arbuckle	Nov. '36	2	97,033	3,295	33	44	Texas, Sinclair
Edwards, 34-17-8w	Arbuckle	Jan. '36	59	1,777,727	3,246	1,226	41	Cities Service, Continental, Phillips, Texas
Geneseo, 25-18-8w	Arbuckle	Apr. '34	147	4,262,789	3,140	2,823	39	Phillips, White Eagle
Hafferman, 6-19-9w	Arbuckle	May '36	10	368,638	3,210	197	46	White Eagle
Heinz, 8-18-10w	Kansas City	July '38	1	15,424	3,000	14	41	White Eagle, Phillips, Texas, Skelly
Keesling, 10, 15-20-9w	Arbuckle	Apr. '35	42	2,431,999	3,214	682	43	Skelly
Lyons, 14-20-8w	Wilcox	Nov. 39	1	2,787	3,250	5	39	Phillips, White Eagle, Skelly
Midway, 8-20-9w	Arbuckle	Apr. '39	6	53,130	3,250	130	43	Phillips, White Eagle, Cities Service, Vickers
Orth, 28-17-10w	Arbuckle	July '32	12	586,568	3,240	206	40	Phillips, White Eagle
Orth, 28-17-10w	Kansas City	June '37	2	25,058	2,906	30	40	Phillips
Ploog, 13-18-9w	Arbuckle	July '30	10	1,118,764	3,230	163	47	Sinclair
Proffitt, 12-20-10w	Arbuckle	Dec. '38	1	1,538	3,227	.....	..	Skelly, Sinclair
Raymond, 21-20-10w	Arbuckle	July '29	30	5,507,341	3,350	419	41	Sinclair
Raymond, 21-20-10w	Kansas City	July '36	4	86,435	3,140	51	41	Phillips
Rickard, 22-18-9w	Simpson	Sept. '35	1	47,099	3,324	18	37	Stanolind, White Eagle, Skelly
Silica, 10-19-10w	Kansas City	June '39	7	61,280	3,050	177	42	Skelly, White Eagle
Stumps, 4-18-10w	Arbuckle	May '35	24	742,251	3,320	394	42	Skelly
Welch, 2-21-6w	Chat	Apr. '24	29	4,142,921	3,300, 3,400	333	34	Phillips, Sinclair
Wenke, 7-20-10w	Arbuckle	Mar. '35	7	225,589	3,280	93	42	White Eagle, Sinclair
Wenke, West, 18-20-10w	Arbuckle	Oct. '38	2	59,165	3,280	34	42	Sinclair, Skelly
Wherry, 11-21-7w	Conglomerate	Sept. '33	203	5,846,743	3,390	3,554	32	White Eagle
Wherry, East, 12-21-7w	Conglomerate	Sept. '37	3	58,848	3,460	52	38	White Eagle
ROOKS COUNTY								
Dopita, 31-18-17w	Arbuckle	Aug. '34	4	75,593	3,408	70	25	Phillips
Dopita, 31-18-17w	Kansas City	Apr. '38	1	14,310	3,215	21	25	Phillips
Kruse, 3-10-16w	Kansas City	July '38		4,823	3,128	.....	..	No connection
Laton, 11-9-16w	Kansas City	July '27	14	397,872	3,235	446	39	Vickers, Cooperative P. L.
Westhusin, 11-9-17w	Kansas City	Nov. '36	11	266,974	3,240	223	36	Cooperative P. L.
Zurich, 26-10-19w	Kansas City	Sept. '35	3	92,309	3,400, 3,500	51	35	Stanolind
RUSH COUNTY								
Otis, 22-18-16w	Basal sand	Dec. '35	17	1,217,242	3,493	682	33	Bay
RUSSELL COUNTY								
Anschutz, 10-15-13w	Arbuckle	Apr. '36	2	80,009	3,315	33	37	Phillips
Atherton, 30-13-14w	Arbuckle, K.C.	July '35	36	692,295	3,015, 3,285	888	38	Stanolind, Texas, Cities Service, White Eagle
Atherton, North, 18-13-14w	Arbuckle	June '39		2,973	3,134	..	24	No connection
Big Creek, 25, 36-14-15w	K.C., Gorham, Arb.	July '35	37	1,318,253	3,000, 3,155, 3,175	704	37	Phillips, White Eagle, Texas
Big Creek, East, 31-14-14w	Arbuckle	July '38	2	25,154	3,149	40	37	White Eagle
Big Creek, East, 31-14-14w	Kansas City	Aug. '39	2	13,431	2,940	61	37	White Eagle
Boxberger, 36-15-15w	Kansas City	Dec. '35	4	119,979	3,140	32	37	Phillips
Bunker Hill, 31-13-12w	Kansas City	Oct. '35	2	55,614	3,000	.....	39	White Eagle
Coralena, 8-15-13w	Arbuckle	May '37	44	713,634	3,183	926	38	Continental, Texas, Phillips
Coralena, 8-15-13w	Kansas City	Jan. '37	24	292,810	2,960	428	38	Continental, C. S., W. E., Texas, Phillips
Coralena, 8-15-13w	Dodge	Feb. '39	1	10,662	2,895	17	38	Texas
Donovan, 10-15-15w	Kansas City	July '39	1	7,037	3,195	18	37	White Eagle
Dubuque, 34-15-12w	Arbuckle	Oct. '35	2	135,227	3,290	42	38	Texas
Dumler, 1-14-15w	Arbuckle	Aug. '37	1	32,608	3,303	18	35	Texas
Dumler, 1-14-15w	Kansas City	July '39	1	5,381	3,110	16	35	Phillips
Dumler, 1-14-15w	Topeka	Mar. '35	5	226,628	2,770	100	35	Texas, Phillips, Cities Service
Eichman, 34-15-13w	Arbuckle	May '35	6	504,199	3,312	99	38	Texas
Fairfield, 22-15-13w	Kansas City	Dec. '38	1	4,643	3,160	6	36	Texas
Fairfield, North, 10-15-13w	Arbuckle	Sept. '39	4	13,684	3,320	120	36	Texas, Cities Service
Fairfield, North, 16-15-13w	Kansas City	Jan. '39	1	32,591	3,410	20	36	Cities Service
Fairport, T. 11, 12, 13, R. 15, 16w	K.C., Arbuckle	Nov. '23	141	14,324,288	3,100	1,786	42	Stanolind
Foster, 19-15-15w	Kansas City	May '38	1	11,666	3,312	12	37	Texas
Gorham, T. 13, 15, R. 14, 15w	Arb., K.C., Topeka		159	10,665,880	3,030, 3,290	2,448	35	C. S., W. E., Phillips, Texas, Stanolind

Pool name and location (S.-T.-R.)—	Prod. formation	Disc. date	No wells 5-1-40	Total prod. to May 1, 1940	Ave. pay depth	Dly. ave. prod. Apr. '40	Ave. grav.	Purchasing companies
Greenvale, 4-15-12w	Arbuckle	Nov. '38	2	10,587	3,267	18	38	Texas
Greenvale, 4-15-12w	Kansas City	Apr. '38	8	79,291	3,049	165	38	Texas, Continental
Gurney, 23-26-14w	Pre-Cambrian, K.C.	Feb. '35	68	942,863	3,001, 3,258	1,490	40	Texas, Phillips, Cities Service, White Eagle
Gurney, 23-14-14w	Topeka	Nov. '36	2	47,752	2,800	52	40	White Eagle, Texas
Gurney, South, 23-14-14w	Gorham, K.C.	Aug. '36	20	592,195	2,950, 3,192	480	40	Cities Service, Texas, Phillips, White Eagle
Hall, 30-14-13w	Arb., Gorham, K.C.	May '31	141	2,854,629	2,838, 3,110	2,917	38	Continental, Texas, Phillips
Hall, 29-14-13w	Pre-Cambrian	Sept. '38	1	5,985	3,315	....	38	White Eagle, Cities Service
Karst, 27-15-14w	Arbuckle	Oct. '35	4	154,305	3,355	73	34	Phillips
Michel, 36-14-14w	Kansas City	June '37	2	42,928	2,901	34	38	Cities Service, Texas
Michel, 36-14-14w	Topeka	Aug. '38	1	7,267	2,852	6	38	Phillips
Neidenthal, 23-14-15w	Arbuckle	Aug. '34	9	810,223	3,225	121	40	Phillips
Neidenthal, 24-14-15w	Kansas City	Apr. '35	1	1,285	3,195	22	40	Phillips, Texas
Peterson, 12-14-15w	Arbuckle	Sept. '36	1	43,622	3,293	20	35	Phillips
Russell, 27-13-14w	Arbuckle	Feb. '34	46	3,866,923	3,275	728	36	Texas
Russell, 27-13-14w	Kansas City	Aug. '34	3	263,697	3,050	54	36	Texas, Phillips, Stanolind
Sellens, 26-15-13w	Topeka, Arb., K.C.	June '29	27	2,334,300	3,335	453	38	Stanolind
Smoky Hill, 2-15-14w	Kansas City	Jan. '38	2	24,561	2,960	26	38	Texas, Phillips
Steinert, 20-15-15w	Kansas City	July '36	1	33,367	3,060	13	39	Texas
Sullivan, 1-14-15w	Topeka	Aug. '36	1	63,631	2,780	20	35	Texas
Sullivan, 10-14-15w	Gorham	Mar. '35	131	4,485,359	3,310	2,471	35	Phillips
Sullivan, 2-14-15w	Tarkio	June '36	1	73,680	2,525	15	35	W. E., Phillips, Stanolind, C. S., Texas
Trapp, 31-15-13w	Arbuckle	Mar. '36	497	12,856,228	3,250	9,770	39	Cities Service
Trapp, 36-15-14w	Conglomerate	July '37	1	25,527	3,281	20	39	Texas, W. E., Phillips, C. S., Continental
Trapp, 23-15-14w	Kansas City		30	419,614	3,060	462	39	Continental
Trapp, 31-15-13w	Topeka	Sept. '36	2	76,053	2,889	35	39	Texas, Continental, Cities Service
Trapp, West, 15-15-14w	Arbuckle	July '39	4	18,746	3,257	71	39	Texas, Phillips
Vaughn, 17-14-14w	Arbuckle	Dec. '37	4	69,156	3,242	74	40	Phillips
Vaughn, 17-14-14w	Gorham	Apr. '38	2	21,562	3,282	34	40	Cities Service, Phillips, Texas
Vaughn, 17-14-14w	Kansas City	Mar. 37	21	550,064	3,025	398	40	Phillips
				SCOTT COUNTY				Phillips, Cities Service
Shallow Water, 15-20-33w	Mississippi	Dec. '34	8	801,429	4,625	423	25	Atlantic
				SEDGWICK COUNTY				
Eastborough, 19-27-2e	Chat, Viola	Aug. '29	36	7,706,452	2,956, 3,238	566	40	Derby, White Eagle
Goodrich, 16-25-1e	Kansas City, Hunton	Dec. '28	33	2,424,364	2,615, 3,336	616	38	Continental, Derby
Greenwich, 14-26-2e	Chat, Viola, Wilcox	Apr. '29	43	9,167,068	2,885, 3,321	661	34	Shell, Skelly
Robbins, 21-28-1e	Chat	Apr. '29	30	2,943,543	3,100	330	40	Derby, White Eagle
Valley Center, 1-26-1w	Kansas City, Viola	Aug. '28	41	19,767,713	2,570, 3,366	877	36	Continental, Derby
				STAFFORD COUNTY				
Drach, 12-22-13w	Arbuckle	Nov. '37	9	159,203	3,694	189	41	Stanolind
Fischer, 31-21-12w	Arbuckle	May '38	5	47,073	3,641	91	37	Stanolind
Gates, 27-21-13w	Arbuckle	May '23	11	509,881	3,670	218	38	Stanolind
Jordon, 15-25-14w	Kansas City	Feb. '37	4	139,934	3,643	76	34	Skelly
Kipp, 27-25-14w	Kansas City	Jan. '37	2	63,768	3,825	54	33	Skelly
Leesburgh, 12-25-13w	Arbuckle	Apr. '38	9	40,789	4,155	227	38	Stanolind
Max, 35-21-12w	Arbuckle	Aug. '38	3	15,493	3,570	51	34	Stanolind
Max, 35-21-12w	Kansas City	May '39	1	10,024	3,356	22	34	Stanolind
McNaughton, 27-24-13w	Arbuckle	Apr. '37	10	244,185	4,075	227	36	Stanolind
Mueller, 29-21-12w	Arbuckle	Apr. '38	2	76,363	3,594	33	40	Stanolind, Falcon
Rattlesnake, 11-24-14w	Kansas City	Oct. '38	1	14,198	3,650	21	26.5	Skelly
Richardson, 6-23-11w	Arbuckle	Sept. '30	60	3,621,291	3,580	1,047	41	Stanolind
St. John, 23-24-11w	Arbuckle	May '35	9	336,211	4,075	217	36	Stanolind
Sittner, 33-21-12w	Arbuckle	Dec. '37	3	69,867	3,600	47	40	Stanolind
Sittner, 33-21-12w	Kansas City	Sept. '37	2	45,848	3,278	26	40	Stanolind
Sittner, South, 3-22-12w	Arbuckle	May '38	10	50,203	3,600	168	40	Stanolind
Snider, 3-21-11w	Arbuckle, Simpson	Feb. '36	5	149,916	3,325	73	34	Sinclair
Snider, South, 16-21-11w	Arbuckle, Simpson	Aug. '38	3	18,503	3,402	36	34	Sinclair
Zenith, 23-25-11w	Misener	Sept. '37	190	2,152,655	3,790	3,887	41	Stanolind
				SUMNER COUNTY				
Anness, 2-30-4w	Wilcox	Nov. '37	1	31,902	4,394	16	32.5	Skelly
Caldwell, 17-35-3w	Wilcox	Apr. '29	4	1,277,512	4,750	192	47	Gulf
Wellington, 32-31-1w	Chat	Dec. '29	99	4,172,249	3,675	1,506	41	Derby
				TREGO COUNTY				
Gugler, 36-12-21w	Arbuckle	Nov. '36	1	15,458	3,830	11	..	White Eagle
Wakeeney, 14-11-23w	Kansas City	Sept. '34	12	362,445	3,830	129	39	Texas, Phillips
Total			6,183	349,013,968		115,210		

Economies of Slim-Hole Drilling Attract Operators' Attention

(Continued from Page 57)

surface pipe solidly below this formation to protect the oil string from corrosion.

Pumping Equipment

With the adoption of the draw-down method of taking potentials in Kansas it is no longer necessary that heavy-duty, high-speed pumping equipment be installed, as was necessary when physical tests were the rule. Furthermore, in these days of stringent proration and low allowables, much smaller units are entirely capable of pumping the allowed production. Wells which formerly would have been equipped with a pumping derrick and standard front at a cost of from $7,500 to $10,000 are now being equipped with smaller and lighter equipment at a cost of from $1,000 to $2,500. Some of the slim-hole wells have been equipped with a small mast for servicing the well after completion. Considering that portable servicing equipment carrying its own mast is available, many operators are not erecting masts over their wells. Taking the place of the standard pumping units are small unit pumpers, some of which have as low as a 5-hp. rating. The majority of the wells using this light-weight equipment are pumping from depths of 1,500 to 2,500 ft.

One major company has advanced the practice of pumping the allowed production from three or four wells with one portable 5-hp. unit. These small units have been adopted on the assumption that in most cases the fluid levels in Arbuckle lime wells will be high and will not fall, or be reduced by pumping, to depths greater than 1,500 ft. If and when the encroachment of water proves the use of these small units uneconomical and impractical they may be replaced with larger units, salvaged from abandoned wells at an additional expense of approximately $3,000, and the smaller units moved to new developments.

The introduction of lighter pumping equipment has not only reduced the initial cost to a minimum, but is reducing operating costs as well.

Conclusions

Slim-hole drilling, having no other feature superior to methods used in the past, is warranted purely from a financial point of view. The total saving being effected in Kansas by the use of slim-hole drilling and lighter pumping equipment is amounting to from $7,000 to $12,000 over the conventional-type wells using heavy-duty equipment, as was the practice 2 years ago. Its advent into Kanwas in answer to a wide demand for reduction in development costs that would make possible development of acreage which would not be commercially attractive with usual development costs. Despite the acute proration situation, Kansas drilling activity is again showing a progressive increase; probably due, in part, to the successful application of slim-hole drilling.

Winfield an Oil Center

Winfield, Kans., county seat of Cowley County, Kansas, with 10,000 population, lies in the center of rich oil production with daily potential in excess of 285,000 bbl. Over 300 producing wells are located in close proximity to Winfield.

The city is governed by a city-manager administration with low tax rate of 6.89 made possible by earnings from city-owned light, water, and gas plants. Transmission lines serve rural communities and the oil fields.

Current Developments in

Drawdown Method of Taking Potentials in Kansas

By MARSHALL BROWN
Superintendent, W. I. Southern, Inc.

Marshall Brown, the author of this article, is production superintendent for W. I. Southern, Inc., an independent firm having large holdings in Kansas, particularly in the Trapp pool. He has had a wide experience in oil production and petroleum engineering both in this country and abroad. Before entering college, he worked in the Ranger and Breckenridge fields and interrupted his education to dress tools on a wildcat well in Utah. After being graduated from Oklahoma University, he attended Columbia University for 1 year and then joined Gulf Oil Corp. in Fort Worth as an engineer in 1924. He was with the Independent Oil & Gas Co. as assistant chief geologist from 1927 to 1932. The next 4 years he spent in Lagunillas, Venezuela, as production foreman for the Venezuela-Gulf Oil Co. He returned to this country in 1936 to become assistant superintendent for Gulf Oil Corp. at Hobbs, N. M., quitting that post to take his present position.

DAMAGE caused to the reservoir and the extremely high expense of testing demanded the discontinuance of physical-pumping potential tests in Kansas. The expense of equipping wells for taking these periodic physical potentials was prohibitive and in many cases represented the difference between profit and loss on a property.

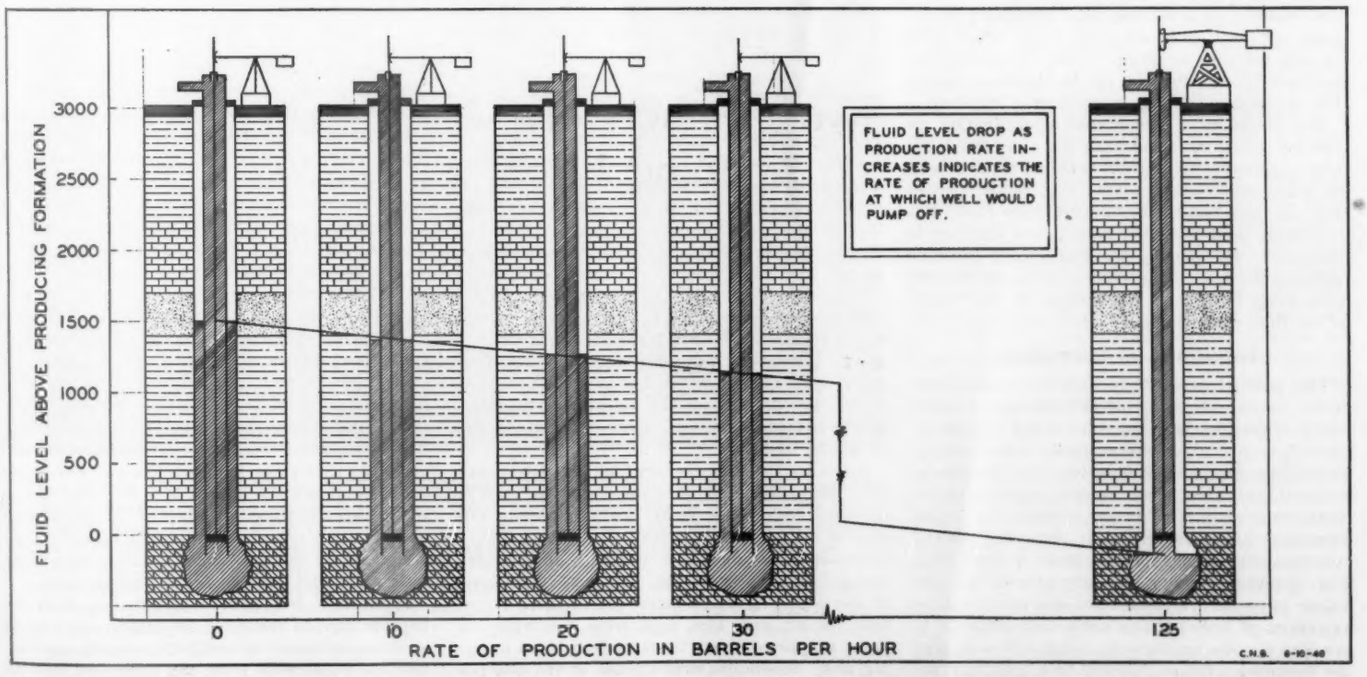
During the past 2 years the rules and regulations of the Kansas Corporation Commission have been revised to permit the operators to substitute for physical tests an engineering method of measurement which can easily be made with inexpensive equipment and which does no damage to the pool by excessive rates of withdrawal. What was experimental 2 years ago is today an accepted standard practice in Kansas.

For years every oil operator had formulated an estimate of his well's worth by bailing and observing the "fillup." It was only natural that of the many plans proposed to determine the ability of a well to produce, some specific application of this inexpensive and effective method of measurement should be adopted. Such is the present well-testing program in Kansas, whether the instrumentality be echometer, depthograph, sonicmeter or bottom-hole pressure bomb. The basic factor is the pressure at the face of the formation, either in pounds per square inch or in feet of fluid level.

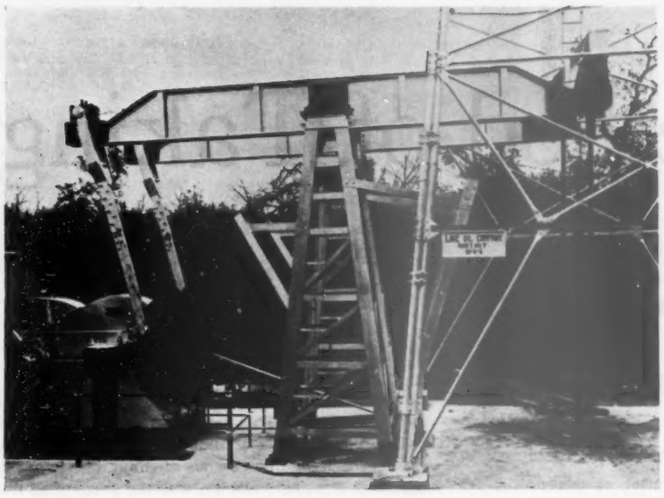
Technically, it was easier and more accurate to determine the empty portion of the cased hole than to measure the portion occupied by fluid. Either of these determinations was a function of the total depth and, either one known, the other was readily obtainable. So the sonic method of measuring the length of the gaseous column above the fluid level was introduced. This determination could be made while the well was actually producing. The sound wave, traveling in a gaseous medium in the annular space at uniform velocity, was the measuring line. This determination of velocity was simplified because each uniformly spaced tubing collar, already measured in feet, gave a minor rebound of the sound wave and a ready check on the actual velocity. Thus no calibration of the instrument was necessary preparatory to the actual test.

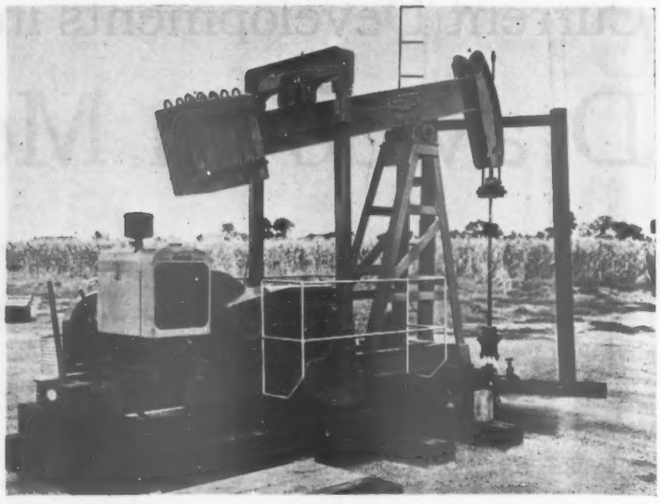
In general, the procedure to measure any desired well is: (1) Determine the static fluid level; (2) determine the stabilized level when the well is actually producing at (*a*) 10 bbl. per hour, (*b*) 20 bbl. per hour, and (*c*) if desired, at 30 bbl. per hour, and occasionally at higher rates. With each increase in rate of production the fluid level in the casing declines.

Now, let us reverse the field. We are no longer interested in the actual fluid level but principally with the production rate when that fluid level has dropped to the top of the pay zone, i.e., when the well has "pumped off." Knowing the well depth and the three fluid levels previously determined, it is an easy calculation to determine the maximum rate at which the well can "pay off," or how good or bad the well is. On coordinate paper three or more points (production rate plotted against depth of fluid) can be used to project a line and the



Schematic drawing indicating how the height of the fluid level decreases as the rate of production increases. When the fluid level is plotted graphically against rate of production, the points form a straight line. Extending this line to zero fluid level establishes the capability of the reservoir to produce oil into the well bore





Left: Heavy-duty rig front costing from $5,000 to $7,500, driven by a 100-hp. engine, and capable of handling up to 4,000 bbl. per day. This was the type pumping unit needed under physical potentials. Right: Small twin-crank pumping unit driven by a 10-hp. engine and costing between $1,200 and $2,000. Use of this size unit was made possible through adoption of the drawdown method of taking potentials

maximum capacity of the well determined. This last figure, with deductions for water if the well is "wet," is the productive capacity, or potential, of the well and is used to determine its relation to all the other wells in the pool.

Another calculation easily establishes the productivity index, frequently used by the engineers. Productivity index is, as its name implies, merely a gage or indicator of the performance of the well and reservoir. Simply stated, it is the daily production in barrels per foot of drawdown of fluid level or per pound drop in bottom-hole pressure.

Obtaining Data

The equipment necessary for determining the fluid level in pumping wells can be rented from several different service companies. Essentially, the different machines all consist of a means of generating a wave and a system of recording the reflected vibrations set up when the wave strikes each successive tubing collar, the tubing catcher and finally the fluid level. The reflected vibrations are recorded on a moving tape, graduated in seconds, or on a light sensitive paper which also records the time intervals. Using this equipment, the fluid level of the well can be obtained, regardless of whether the well is pumping or standing.

For obtaining a comparable determination on flowing wells, the same principle is followed, except a recording bottom-hole pressure bomb is used to obtain the necessary data. Any standard bomb may be used and no equipment other than that ordinarily used in taking bottom-hole pressure is necessary. The pounds per square inch pressure opposite the face of the sand at different rates of production is directly responsible for the height of the fluid column in the hole.

Importance of Information

The productive capacity and the productivity index, taken over intervals of time, give a quick and accurate picture of the value of the well. When plotted as a decline curve against accumulative production, the index at once becomes valuable in estimating ultimate recoveries and economic limits. With the advent of proration, forecasts of future recoveries become increasingly difficult. The old recovery is as obsolete as the Model T Ford. Tax and depletion men are seriously pressed for real values to sustain their holdings and many unique variations of indices have made their advent. It is hoped that the productivity index will soon give the operators a figure that will be a definite function of the average normal amount of recoverable oil.

Average production indices for pools in western Kansas are of the magniture of 1.5 bbl. production per foot of decline of the fluid level within the casing. When unusually large indices, such as 9.0 are found, it does not follow that the latter is of a well six times as large as the former, but more likely has two or three times the ability to produce ultimately. Data are at present insufficient to determine the relationship between indices, but it is more likely a square-root relationship rather than direct.

Maximum Potentials

A point of great dispute in Kansas has been the allotting of a maximum permitted potential to any well. The rules prescribe no limit for physical potentials, but provide that drawdown potentials shall not exceed 3,000 bbl. per day. The basis for this figure lies in the experience of operators that 3,000 bbl. is a fair approximation of the maximum production which could be obtained from a physical test with the largest equipment available.

Much consternation has been expressed over the magnitude of many drawdown determinations. One primary consideration has been overlooked by many critics, namely, that former physical tests never began to test the capacity of the well but determined only the "maximum physical potential" (up to the point of failure) of the particular surface equipment in use. In other words, some wells, regarded by their owners in the 2,500-3,500-bbl. class, actually had the ability to produce many times that amount.

As a laboratory for steel testing, the physical potential was excellent, but as a method of determining a well's worth, it was unreliable, grossly expensive and very wasteful of reservoir energy. Obviously, to quote one prominent operator, "If the wells were turned upside down, they could not pump some of the indicated capacity of the drawdown method," but they did indicate that the "pay" had terrific ability to give up oil, many times that of nearby wells.

It follows also that the very high indicated capacities show that high ultimate recoveries may be expected from these wells. To substantiate this case of very large productive ability of a well, a major operator selected a well with an indicated capacity of over 30,000 bbl. The static fluid level in this well was 402 ft. below the surface. Three-inch tubing and 1-in. rods were set with the pump at approximately 700 ft. under a 50-hp. pumping unit. Production was started at 165 bbl. per hour and maintained for 24 consecutive hours. During this time, the stabilized fluid level in the hole was above 600 ft., a drop of less than 200 ft. The conclusion must be that there are many wells in Kansas having unbelievable ability to give up fluid and that we must readjust our ideas of many well capacities and ultimate recoveries.

Savings

During the time that physical potential tests were in vogue in Kansas, an average producing well in many western Kansas fields cost in the close approximation of $31,000. This figure is an average of a great many wells drilled and completed by small independent concerns. Larger companies, with higher overhead and warehousing charges, were unable to reach this total by $4,000 to $8,000 additional. This $31,000 could be broken down as follows for an average well:

Drilling expense	$12,000
Tubular goods	8,000
Administration	1,000
Producing equipment	10,000
Total	$31,000

This latter items represented the heaviest, most durable, high-capacity surface equipment on the market. During daily operation it functioned at perhaps 3 per cent of its capacity, but during potential testing it was stressed far beyond its rated capacity and still was insufficient to bring to tankage the output the well was capable of making.

Breakdowns were frequent and extensive, and repair and replacement of equipment consumed an unwarranted portion of the gross income. During a potential testing period on 75-odd producing wells in one Kansas field an independent operator paid $930 in penalties to the state authorities because of 93 breakdowns during potential tests. Perhaps 10 times that amount was spent in replacement of broken equipment. This was during the time that 60-day retests and quarterly regular tests were mandatory.

The disturbance in reservoir equilibrium when these tests were in progress with production rates of 75 to 125-bbl. per hour withdrawal was highly detrimental and the advent of water with the oil was a direct and prompt result of the physical potential. Since the order permitting capacity determinations by the drawdown method, some large-scale economies have made their appearance.

Principally, but least apparent, has been the improvement in reservoir conditions. As a result of stringent proration with the consequent slow rates of withdrawal from the formation and the cancellation of physical tests, a virtually even

(Continued on Page 105)

Geologists, Scouts Play Big Role In Kansas Development

KANSAS oil scouts operate along a front that dwarfs the field of the Battle of France. Their territory stretches westward from Missouri to Colorado, a distance of about 408 miles, while the French battle front from Le Havre on the west coast, through Paris to Switzerland on the east is a distance of about 300 miles.

Weekly, they range that farflung territory from Missouri to Colorado, and from Nebraska to Oklahoma, a distance of about 206 miles, in quest of information about oil-field activity that may be passed on to company executives at Wichita, Tulsa, Dallas, New York and other headquarters cities.

Their duties are multiple. Primarily, they are charged with the task of constantly keeping informed on the progress of the many wells that are being drilled in Kansas each week, so that the status of any operation may be passed on to their superiors on a moment's notice. As there usually are from 250 to 300 wells being drilled, that becomes a man-sized job in itself.

They must know the exact location in the section, township, range and county of each well; by whom it is being drilled, operator and contractor; when it is started, its daily progress, formations penetrated, formation tops and thickness, here oil, gas and water are found, total depths, plugged-back depths, where various sizes of casing and tubing are set, where perforated, where wells are shot or acidized, initial yields, methods by which potentials are taken and results, gravity of the oil, the outlets and other information pertinent to the drilling and completion of an oil or gas well.

When they have completed those little chores, their work has just begun. They must keep informed on leasing activities in the state's 105 counties, who's buying where, and how much. They must know about geologic, seismic and core-drill exploration, and be able to lend a hand in geologic work when needed. They must know about refinery operations, storage facilities, daily average pipe-line runs, attend Corporation Commission proration meetings, and collect other detailed information on the multifarious features of the petroleum industry. To add to the merriment, they are required to assemble their information in weekly letters to headquarters, and compile annual reports covering their whole scope of activity. The Kansas scout of today, as those of other oil states, must not only be a scout but a combined scout-geologist-land man-statistician and reporter.

Cooperation between scouts is necessary if they are to cover the field thoroughly. This is obtained in Kansas through the Kansas Oil Scouts Association, an organization in which practically all scouts operating in the state are members. Ernest O. Black, of Lario Oil & Gas Co., is president of the association. Other officers are Joe E. Bodine, Amerada Petroleum Corp., vice president; E. K. Edmiston of the Tom C. Johnson firm, secretary-treasurer, and Sherrill A. Shannon. Cities Service Oil Co., chairman of the executive committee. A. W. Montgomery, White Eagle division, Socony-Vacuum Oil Co., is president or "czar" of the weekly check meeting held at Wichita.

These Kansas oil scouts, assembled at their weekly check meeting in Wichita, are left to right, front row: N. L. McGee, Standard Oil Co. of Indiana; Harry Cooper, Indian Territory Illuminating Oil Co.; I. S. Layton, Ohio Oil Co.; E. O. Black, Lario Oil & Gas Co.; E. K. Edmiston, Tom C. Johnson; Robert Meyer, Darby Petroleum Corp.; A. W. Montgomery, White Eagle division, Socony-Vacuum Oil Co.; Ted Cady, Continental Oil Co.; Jack Sallee, Gulf Oil Corp.; Jim Smith, Pure Oil Co.

Second row: Charles D. Wells, Carter Oil Co.; Robert Clark, Tide Water Associated Oil Co.; Kermit Woodman, Phillips Petroleum Co.; Steve Powell, Atlantic Refining Co.; Ross Wall, Texas Co.; Joe Bicking, Skelly Oil Co.; Clyde Beebe, Shell Oil Co., Inc.; C. P. Fowler, Jr., Gulf Oil Corp.; Delbert Costa, Pryor & Lockhart, Inc.; Ray Williams, Corporation Commission.

Third row: Jack Paddleford, Stanolind Oil & Gas Co.; Robert Guiru, Cities Service Oil Co.; N. D. Clark, Transwestern Oil Co.; Dick Davis, Barnsdall Oil Co.; Ward Vickery, Vernon Oil & Gas Co.; Victor Reiserer, National Refining Co.; Sandy Lewis, Mid-Continent Petroleum Corp.; Russ McMullen, Vickers Petroleum Co.; James Daugherty, Sinclair Prairie Oil Co.; I. L. Turner, Derby Oil Co. Photo by Bulla Studios, Wichita

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Kansas Geologists

KANSAS is a geologist's paradise. The famed Central Kansas uplift, along which the more active fields are located; the equally famous Nemaha buried mountain range, on or near which some of the state's greatest pools have been developed; the Forest City basin, Salina basin, Dodge City basin, Chautauqua arch, Hamilton dome, many other structural features and a multiplicity of formations, pay sands and limes provide the geologist a territory of constant interest and never-ending exploration.

Recognizing it as a fertile field of geologic work, nearly all major oil companies and many smaller firms and independent operators maintain geologic offices in Wichita or other Kansas cities, from which individual geologists, core-drill and seismograph crews go forth to study the lay of the land. In addition, many consulting geologists are active.

These specialists coordinate much of their work in the Kansas Geological Society, which has offices in Wichita. Officers of the society are: Anthony Folger, Gulf Oil Corp., president; Harold O. Smedley, Skelly Oil Co., vice president; Lee H. Cornell, Stanolind Oil & Gas Co., secretary-treasurer. The board of directors is composed of E. Gail Carpenter, independent geologist; Phil K. Cochran, Carter Oil Co.; John W. Inkster, Shell Oil Co.; George H. Norton, Atlantic Refining Co., and the officers. There are 160 members.

Meetings are held the first Tuesday in each month. Three or four local field trips are held each year, with a major field trip once a year in late August or early September. The society is planning to hold its 1940 major trip in the Black Hills region of the Dakotas.

The society maintains the Kansas Well Log Bureau, with Harvel E. White as manager. This is a nonprofit organization which assembles detailed information on wells drilled in the state. Logs are available in the Wichita offices of the bureau for some 50,000 wells and dry holes. The bureau recently assembled logs for a large number of wells in southeastern Kansas, an area on which information has been scarce and hard to obtain due to the carelessness in logging operations in the older fields.

Members of the society include Charles S. Agey, Amerada; David Ainsworth; W. L. Ainsworth; Donald M. Allen, Foster Oil Co.; Thomas H. Allan, consultant; Benjamin L. Anderson, Skelly Oil Co.; Frank Anderson, consultant; Payton Anderson; Burton E. Ashley, Texas Co.; John S. Barwick, Ranger Oil Co.; George Baughman, Phillips Petroleum Co.; Melvern Bear, Sharon Drilling Co.; B. W. Beebe, Lerke & Whortan; Ralph E. Bending, consultant; M. J. Boreing, Bird & Boreing; Everett L. Bradley, Bradley Brothers; Robert W. Briggart; George H. Bruce, Western Kansas Oil & Refining Co.; E. N. Carlson; Robert Carmody,

(Continued on Page 84)

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Large Gas Reserves Insure Many Years' Supply

By J. H. PAGE
Natural Gas Engineer
Conservation Division, Kansas Corporation Commission

Modern conservation practices will permit Kansas' large gas reserves to serve an expanding market for many years. This article discusses some of the state's most important fields

THE production and sale of natural gas not only has been a major industry in Kansas for the last 50 years, but the development of this cheap fuel found at shallow depths has contributed largely to the growth of Kansas as an industrial state, especially in the eastern counties.

It is logical to divide Kansas into two areas in any consideration of the natural-gas resources. The eastern Kansas district comprises about 35 per cent of the state's area, the western Kansas district about 65 per cent.

Commercial production first was developed in Miami County, in eastern Kansas, in 1860, when several wells were drilled near Paola. It was not until 1884, however, that enough gas production had been developed to justify a pipe line, which was constructed to Paola in that year. This was the first town to be served with natural gas in Kansas. Development spread to southeastern Kansas and by 1900 gas had been discovered in some 15 counties.

There is no accurate record of the number of gas wells drilled in eastern Kansas, but the total undoubtedly is more than 15,000 and probably is nearer 25,000. Depths of wells vary from less than 100 ft. to about 2,000 ft., the majority of them being between 800 and 1,000 ft. deep. Gas is found in sand, limestone, shale, coal, and chert, but the Bartlesville sand, which occurs in a lenticular form in the Cherokee shale, has been the principal producing formation.

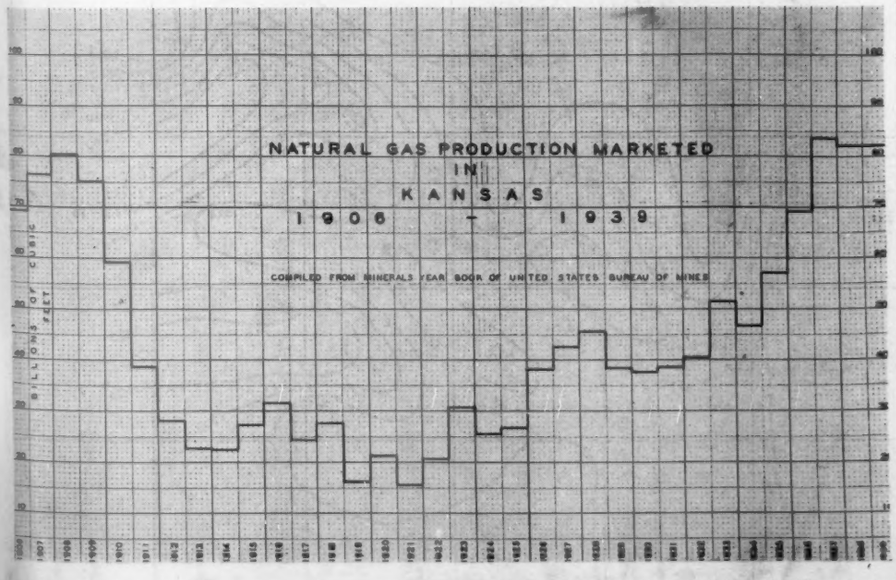
The Piqua gas pool in western Allen and eastern Woodson counties is a typical Bartlesville sand pool. The accompanying map shows the nature of the structure. The pool was discovered in December 1922, on a surface structure mapped on Stanton limestone. The anticlinal producing structure does not appear to exist in beds below the base of the Pennsylvanian system and it is assumed that the apparent folding is caused by differential setting or compaction of the Cherokee shale over and around the two producing-sand bodies which occur within this shale. These sands, called locally the upper and lower Bartlesville, are separated by 100 to 125 ft. of shale. Initial open-flow volumes of individual wells ranged from 500,000 to 12,000,000 cu. ft. and shut-in initial pressures were 295 lb. gage on the upper and 320 lb. on the lower sand. The pool has produced approximately 4,500,000,000 cu. ft. to date and several wells still are producing. The productive area comprises about 880 acres.

Figures on total gas production in the eastern counties to date are not available, nor is it possible to make anything better than a guess as to the reserves of the area. A new well, recently drilled in Jefferson County, in the southern part of the Forest City basin, is reported to have found 8 to 9 million cubic feet open flow in Bartlesville sand, but no other gas wells have been completed near it, so no estimate as to the reserve is possible yet. There is considerable drilling activity in eastern Kansas at all times, but nearly all new wells are small in size. Collectively, however, they can produce a substantial amount of gas and owing to their proximity to markets this activity undoubtedly will continue. A rough estimate of the reserves of eastern Kansas would be some 100 billion cubic feet, although this may prove to be considerably low, especially if additional pools are found in the Forest City basin.

The state's major gas reserves now lie within the western portion of the state. The first gas in this district was found in 1888 near Lyons, in Rice County. There was no further development for many years, however, and practically all of the present fields have been drilled within the last 12 years.

The Hugoton area, largest gas pool in Kansas and one of the larger gas fields in the world, was opened in December 1922 by the Defenders & Traders Oil Co., in Section 3-35-34w, Seward County.

J. H. Page, natural-gas engineer for Corporation Commission, taking back-pressure test on a gas well in the Cunningham field. Picture shows choke nipple on well and dead-weight pressure gage on ground connected to well with copper tubing


NATURAL GAS PRODUCTION MARKETED
IN
KANSAS
1906 - 1939
COMPILED FROM MINERALS YEAR BOOK OF UNITED STATES BUREAU OF MINES
BILLIONS OF CUBIC FEET

Production for 1938 and 1939 estimated

Four more wells were drilled in the immediate vicinity, but it was not until November 1927 that the Stevens County sector was proven by the drill. W. M. McKnab and associates' No. 1 Crawford, Section 31-33-37w, was the Stevens County discovery. Major development followed in 1930 when the first pipe-line outlet from the field was provided and as other lines were constructed additional wells were drilled, so that by January 1, 1940, a total of 282 producers had been completed. These were in Finney, Grant, Haskell, Kearny, Morton, Seward, and Stevens counties. There also are 13 wells in the Texas County, Oklahoma, section of the field. Seven pipe lines provide a market outlet for the gas. The fuel is transported to points as far distant as Detroit and Minneapolis, and major pipe lines from the field to other markets are under consideration at the present time.

Production is from Permian lime and dolomite

MAJOR GAS POOLS IN KANSAS

Pool and county—	Discovery date	Number of wells	Average depth	Producing formation	Estimated proven acreage	Ave. well open flow M.c.f.	Ave. well pressure lb./sq. in.	Total pool open flow M.c.f.	1939 production M.c.f.	Total prod. to 12-31-39 M.c.f.	Developed acreage	Estimated reserve M.c.f.
Cunningham (Viola): Kingman and Pratt	Sept. 1932	32	4,100	Viola lime	10,000	47,730	1,272	1,527,478	2,453,079	8,525,362	5,490	80,000,000
Hugoton: Finney, Grant, Haskell, Kearny, Morton, Seward, Stevens	Dec. 1922	285	2,700	Permian limestones and dolomites	1,380,000	8,600	412	2,445,156	28,964,493	188,964,000	118,353	13,500,000,000
Lyons: Rice	Aug. 1936	*10	3,300	Arbuckle lime / Simpson sand	1,120	20,000	994	†180,600	2,838,722	5,051,284	920	(‡)
Medicine Lodge: Barber	Jan. 1927	33	4,500-5,000	Mississippi lime	8,000	10,200	1,261	337,000	6,380,558	38,000,000	6,360	100,000,000
Otis: Rush and Barton	March 1930	61	3,550	Reagan sand	15,000	26,890	645	1,640,000	8,062,919	§44,426,000	10,610	100,000,000

*One well producing from both Simpson and Arbuckle. †Two wells drilled in but not yet tested. ‡Insufficient data to estimate reserves. §Includes gas marketed only.

at an average depth of 2,700 ft. Wells vary in size from about 1,000,000 to 35,000,000 cu. ft. open flow. Structurally, the field lies on an eastward-dipping monocline, and gas accumulation appears to be due to porosity within the reservoir beds.

No bottom or edge water is present, so undoubtedly there will be a very low abandonment pressure. The gas is found in several different zones within the producing horizon, these being distributed through a vertical thickness of as much as 400 ft. Average heating value of the gas is about 1,025 B.t.u. per cu. ft. The gasoline content is reported to be about ½ gal. a 1,000 cu. ft. The gas is uniformly sweet, with no hydrogen sulfide present.

A Widespread Field

Present development indicates the Hugoton field extends from near the Arkansas River at the north, across Texas County, Oklahoma, at the south, and probably connects with the Amarillo field of Texas. At present, the Kansas portion has an apparent proven area of about 1,380,000 acres. Using the following data: original shut-in pressure 440 lb., average pay thickness 45 ft., average porosity 20 per cent, and abandonment pressure 40 lb., an estimated original recoverable reserve of 9,953,895 cu. ft. of gas an acre is found. Using this figure, the original field reserve for Kansas would be 13,736,375,000,000 cu. ft. Production to January 1, 1940, totaled 188,964,000,000 cu. ft., indicating that approximately 1.30 per cent of its original recoverable gas has been produced. With such a reserve, it could supply the present market for nearly 500 years.

Many of the older wells were drilled on 160-acre units, but all those drilled in recent years are on 640-acre units and some of the 160-acre wells have had additional acreage unitized with the tracts on which they are located.

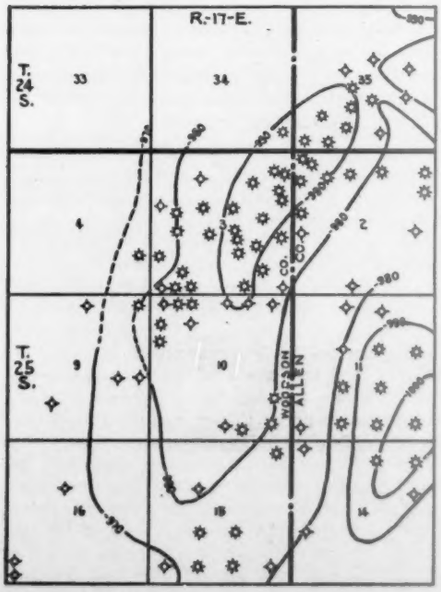
The Cunningham Area

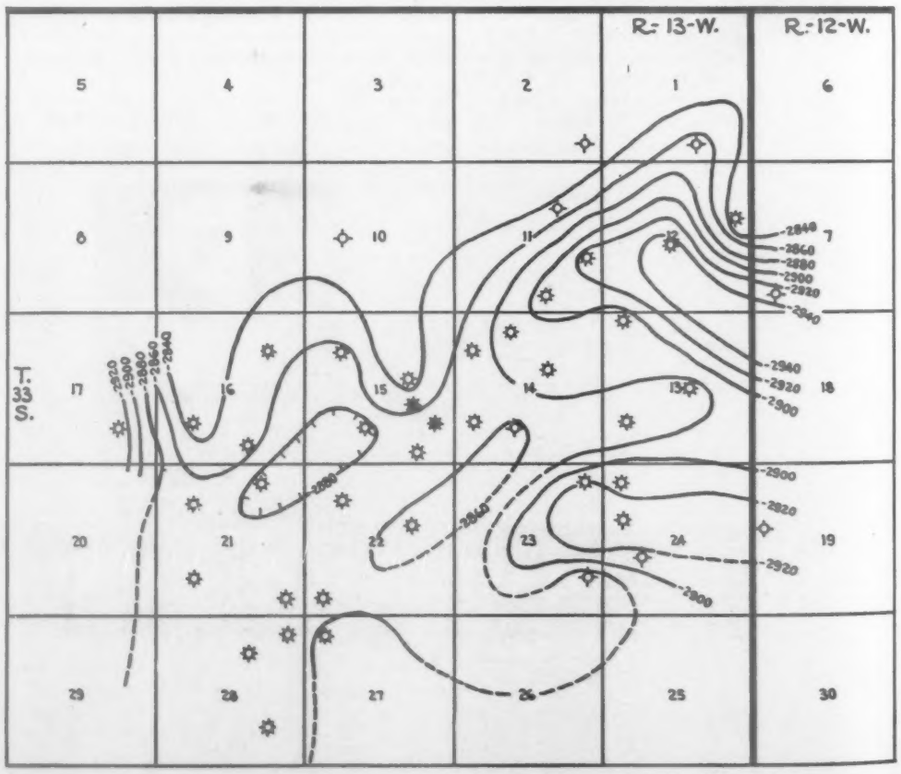
The Cunningham Viola lime gas pool owes its discovery to the search for oil in western Kansas. It was opened at Skelly Oil Co.'s No. 1 Leisman, Section 20-27-10w, Kingman County, in September 1932. Oil and gas previously had been discovered in the area in Lansing-Kansas City lime formations. The Leisman well was drilled to the Viola, Simpson and Arbuckle formations, finding large volumes of gas in all three, and was plugged back and completed in Viola lime for 56,000,000 cu. ft. open flow. Since that time 31 additional Viola gas wells have been completed and the pool appears to be proven for a distance of some 9 miles to the southwest of the discovery. The Kansas Power & Light Co. was the only buyer of Cunningham gas until October 1939 when the Cities Service Gas Co. completed a pipe line from Hutchinson to the pool. The Skelly Oil Co., which operates some 40 oil wells in the field, utilizes some of the Viola gas for pressure maintenance in the Lansing-Kansas City formations. The wells are drilled with rotary tools to top of the Viola and then drilled in with cable tools. Spacing practice is almost universally one well to 160 acres. With average pay thickness of 20 ft., average porosity of 15 per cent, rock pressure 1,300 lb. and abandonment pressure 300 lb., the recoverable reserve figure would be 8,003,353 cu. ft. an acre. As the pool appears to cover about 10,000 acres, this would indicate a field reserve of 80,000,000,000 cu. ft. This figure is for Viola gas only, and there appears to be a considerable reserve in the Simpson and Arbuckle horizons also, but there is insufficient data to estimate it.

The Otis field of Rush and Barton counties was opened in March 1930 when Morgan & Flynn and

(Continued on Page 94)

Below: Typical eastern Kansas gas field, the Piqua gas field in Allen and Woodson counties. Contours on top of Stanton lime, contour intervals 10 ft. Right: Medicine Lodge gas field. Contours on top of Mississippi lime, contour intervals of 20 ft. The structure appears to have little to do with the gas accumulation. The field in general lies on a slope dipping to the southeast and production is found at points having a difference in elevation of more than 100 ft. Two rather deep synclinal areas are found along the east side of the pool but they both produce gas, and one dry hole is located in a high area in the SW Section 14-33-13w. It appears probable that the gas, which occurs in porous zones which form the reservoir, is confined there by a wedging out of these porous zones or a change in lithology, the porosity becoming less at the edges of the field





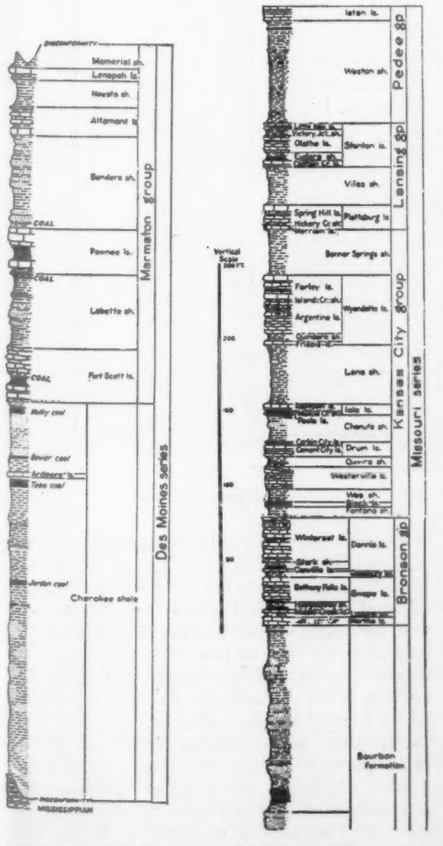
Stratigraphy of Kansas

By RAYMOND C. MOORE
State Geologist of Kansas

KNOWLEDGE of the characters of rock formations occurring in Kansas has greatest practical importance in exploration for oil and gas in this part of the Mid-Continent region and in development of the oil and gas supplies after fields have been discovered. Work of the geologist in studying surface outcrops is commonly a first step in the location of acreage that may be deemed worthy of leasing and drilling. In some cases these studies have direct bearing on the interpretation of observed local geologic structures, and in all cases they furnish guides for correlation of the formations penetrated in wells. As a matter of fact, there are innumerable ways in which the investigations of characters of rock formations have direct or indirect bearing on oil and gas development. This article has been prepared in response to a request for a summary of the rock characters observed in Kansas. The classification, nomenclature, and correlation of rock strata from place to place comprise the division of geologic science termed stratigraphy. It is interesting to note that nowhere in the United States are conditions better suited for a variety of stratigraphic studies, many of which help in establishing principles, than such work in Kansas.

Six Major Rock Divisions

Consideration of Kansas rocks in broadest view calls attention to a natural division of them into six major parts. This division is not based on kinds of materials, such as sandstone, shale, limestone and other rocks, and it does not refer to the condition of the rocks, whether consolidated or unconsolidated, whether exposed at the surface or known to exist only in certain parts of the subsurface. The major divisions here considered are based on relationships in the age of their formation, on general distinguishing features of composition, and on significant dissimilarities in their regional structure. In order of age from oldest to youngest, the six major rock divisions of Kansas are as follows: (1) the pre-Camberian rocks; (2) the pre-Carboniferous Paleozoic sedimentary rocks; (3) the Lower Carboniferous or Mississippian rocks; (4) the Upper Carboniferous or Pennsylvanian and Permian formations; (5) the Mesozoic rocks, chiefly belonging to the Cretaceous system; and (6) the Tertiary and Quaternary sedimentary deposits. The distribution and general character of each of these divisions will be described briefly.



Lower Pennsylvanian section (left column below right in all figures)

Pre-Cambrian Rocks

This division underlies all of Kansas, but is exposed nowhere within the borders of the state. It forms the so-called basement, or floor, on which all of the succeeding rocks are laid, and a well located in any county, if drilled sufficiently deep, would encounter it. About 300 wells have actually been drilled into the pre-Cambrian rocks of Kansas. About two-fifths of these granite wells are located in the eastern one-third of the state, east of the prime meridian. Many are distributed along the Nemaha granite ridge, trending in a south-southeasterly direction from Nemaha County to eastern Sumner County. Three-fifths of the number of wells penetrating pre-Cambrian rocks are located in western ranges of the state. Many occur along the Central Kansas uplift, extending northwestward from Barton County.

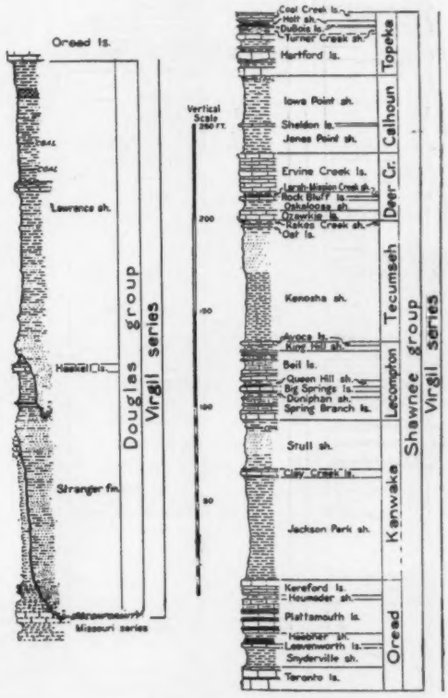
The pre-Cambrian rocks consist chiefly of granite and schist, but there are various other sorts of igneous and metamorphic rocks, including some dark basic types. Among metamorphosed sedimentary formations that are recognized in Kansas are rocks such as quartzite and slate. Locally there is much arkose, a type of grit or sandstone that contains detrital feldspar.

Because of their dense texture, extreme geologic antiquity, and the conditions of their formation, pre-Cambrian rocks are well known to be lacking in value as potential containers of oil or gas. In view of this, it is especially interesting to report commercial quantities of oil in pre-Cambrian arkose on flanks of the Central Kansas uplift. This is one of the exceptions that prove a rule, however, for there is no question but that the oil is derived from geologically younger formations, and that it has found its way into the arkose because of the structural conditions and the pore space available in the arkose.

The surface of the pre-Cambrian rocks is decidedly uneven from the standpoint of its elevation in different parts of Kansas. From its highest elevation, a little over 500 ft. above sea level, in Nemaha County, this surface descends to below sea level in most of eastern Kansas and is considerably below sea level in the western part of the state. In any one district the surface is probably fairly smooth, although gently sloping, and it lies approximately parallel to the bedding planes of the stratified rocks that rest upon it.

Pre-Carboniferous Rocks

Formations belonging to the Cambrian, Ordovician, Silurian and Devonian systems form a natural major group of rocks in Kansas, because the strata belonging to them lie essentially parallel to one another throughout their thickness, and because they exhibit general similarities in composition and structure. In upward order, stratigraphic divisions belonging to these systems include: (1) The Lamotte sandstone (Upper Cambrian); (2) the Arbuckle group (Upper Cambrian and Lower Ordovician), consisting mostly of cherty dolomite and commonly known as the siliceous lime; (3) the Simpson group (Lower Ordovician), consisting largely of sandstone and green shale and comprising the so-called Wilcox sand of many oil fields, and the St. Peter sandstone of areas in eastern Kansas; (4) the Viola lime (Middle and Upper Ordovician); (5) the Maquoketa shale, (Upper Ordovician); and (6) the Hunton lime (Silurian and Devonian). There is much variation in the thickness and character of these divisions from place to place in Kansas. The lowermost rocks (Lamotte and lower Arbuckle) are much the most widespread, and they tend to retain lithologic characters with little variation between districts. The uppermost, youngest part of the pre-Carboniferous rocks is restricted in distribution to basins such as the Forest City basin, the Salina basin, and the Dodge City basin. The maximum combined thickness of the pre-Carboniferous rocks is a little over 2,000 ft., but in most places the total thickness is much less than this figure. There are several unconformities within the succession, but because there was absence of any significant deformation in the

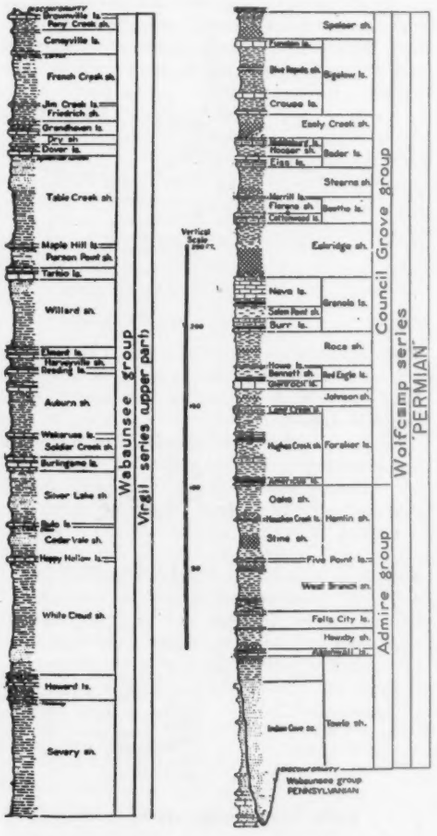


Upper Pennsylvanian section (part)

Kansas region until after the time of making these rocks, the beds lie essentially parallel one on another.

Lower Carboniferous

The Lower Carboniferous, or Mississippian, rocks of Kansas consist mostly of limestone, but they include some shale and sandstone. One of the most widespread formations is the Chattanooga shale, mainly a black slaty deposit containing much carbonaceous matter and considered by many geologists importantly related to the occurrence of oil and gas in associated strata. It is not certain whether the Chattanooga shale is actually of late Devonian or earliest Mississippian age, but there is no question as to its sharp distinction, both structurally and stratigraphically, from the Hunton and underlying pre-Carboniferous rocks on the one hand, and its close similarity in structure to succeeding Mississippian formations on the other. The pre-Chattanooga formations of the Kansas region were gently folded and leveled by erosion before deposition of the Chattanooga shale and the succeeding Mississippian rocks.



Upper Pennsylvanian and lower Permian section

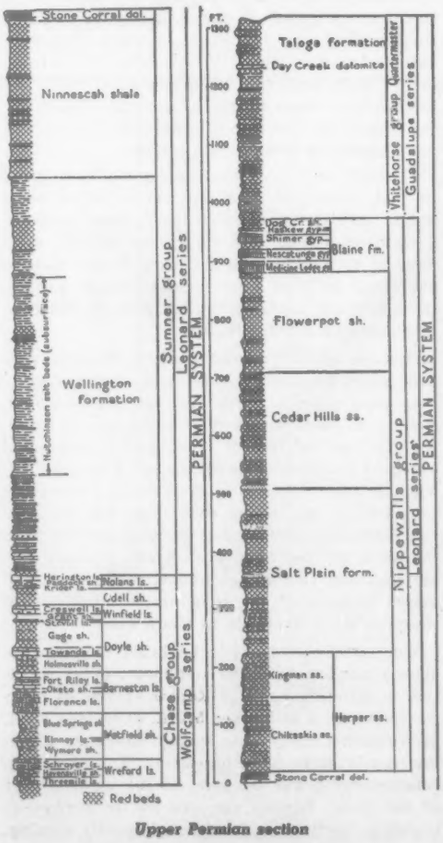
The thickness of the Chattanooga and overlying Mississippian rocks ranges from a feather edge to a known maximum in Kansas of 1,138 ft. Detailed studies of the Mississippian rocks of Kansas by Wallace Lee, in a cooperative project of the federal and state geological surveys, have led to recognition in the subsurface of Kansas of most of the Mississippian formations occurring in western Missouri and in Iowa. The report by Mr. Lee is now in press and is to appear as Bulletin 32 of the Kansas Geological Survey. Among the units recognized by Mr. Lee are the following, arranged in order of age from oldest to youngest: (1) Chattanooga shale, unconformity; (2) Chouteau limestone (including Northview shale and Compton limestone); (3) Sedalia limestone, unconformity; (4) Gilmore City limestone, unconformity; (5) St. Joe limestone; (6) Reeds Spring limestone; (7) Burlington limestone, unconformity; (8) Keokuk limestone, unconformity; (9) Cowley formation; (10) Warsaw limestone; (11) Spergen limestone; (12) St. Louis limestone; (13) Ste. Genevieve limestone, unconformity; and (14) rocks of Chester age.

The Chattanooga shale is thin and black in southeastern Kansas. Northwestward it thickens and changes to dark gray or somewhat greenish. The thin Compton and Northview beds of southeastern Kansas grade into cherty Chouteau limestone in the northeastern part of the state, where this division is locally more than 125 ft. thick. The Sedalia limestone consists mostly of buff dolomite containing a little chert. This formation is recognized by Lee in northeastern Kansas, and he reports that it overlaps the Chouteau and rests on the weathered surface of the Chattanooga shale. The Gilmore City limestone is noncherty, gray and buff, and contains some oolitic zones. This formation is tentatively identified in the studies by Lee as present in the northeastern part of Kansas, and as comprising the oldest Mississippin rocks west of the Nemaha ridge.

Rocks of Osage age include noncherty semigranular limestone (St. Joe) containing some red and green shale, these beds occurring mainly in southeastern Kansas; dolomitic limestone containing much dark chert (Reeds Spring), spread far to the northwest but not reaching the northeastern part of Kansas; and gray limestones and dolomites with opaque white chert (Burlington and Keokuk), widely distributed.

The Cowley formation is a subsurface division proposed by Lee for dark silty limestones and dolomites that reach a maximum thickness of about 350 ft. in Cowley and Chautauqua counties, Kansas. The formation rests unconformably on lower Mississippian formations and the Chattanooga shale and is regarded as filling a broad basis carved in the south-central Kansas and northern Oklahoma region after Keokuk time. The formation is conformably overlain by the Warsaw limestone, which consists mostly of gray cherty limestone. Rocks of later Meramec age include the Spergen, St. Louis, and Ste. Genevieve strata, consisting mainly of white oolite and somewhat granular noncherty limestone. The upper Meramec beds (Warsaw to Ste. Genevieve) are reported by Lee to have an aggregate thickness of 690 ft. in Clark County.

Limestone and shale of Chester age occur locally in southeastern Kansas resting unconformably on the Warsaw limestone, and it has been reported by G. S. Dille from wells in southwestern Kansas and northwestern Oklahoma.



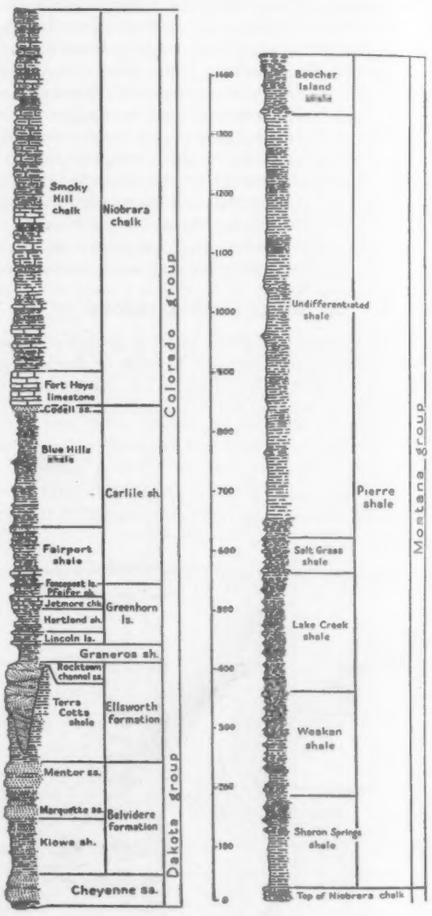
Upper Permian section

Rocks of Chester age occur locally in southeastern Kansas resting unconformably on the Warsaw limestone, and it has been reported by G. S. Dille from wells in southwestern Kansas and northwestern Oklahoma.

Upper Carboniferous and Permian Rocks

The uppermost Paleozoic formations of Kansas, which are classified as Upper Carboniferous (Pennsylvanian) and Permian in age, are grouped together because of their entirely similar parallel structure, their general resemblance in lithologic features, and because they are set apart from underlying and overlying beds by differences in regional structure and occurrence of very important bounding unconformities. The Mississippian and older rocks have been deformed rather considerably (although not folded), especially along the line of the Nemaha granite ridge and the axis of the Central Kansas uplift, and the date of this deformation clearly belongs before the time of early Pennsylvanian sedimentation in the Kansas region. Uppermost Mississippian (Chester) rocks and lowermost Pennsylvanian (Pushmataha, Morrow, and Pampases—stages defined in the Texas, Oklahoma, and Arkansas regions) are almost en-

(Continued on Page 90)



Cretaceous section

Water Flooding in Kansas

By PAUL REED

KANSAS now has the distinction of containing one of the few areas in the world where water flooding is applied systematically to a considerable extent. Although the systematic injection of water for the purpose of producing oil has been practiced in Pennsylvania as an important means of secondary recovery for nearly 20 years, there have been only a few scattered applications of this method outside of the Brandford, Pa., area except in the Mid-Continent flooding area, which consists of counties in northeastern Oklahoma and southeastern Kansas, that have produced more than 8,500,000 bbl. of oil by water flooding during the preceding 5 years. This gives impressive indication that water flooding has significance for the future as a means of obtaining larger recoveries in the Mid-Continent.

Present production from the principal waterflood projects in Kansas is approximately 3,000 bbl. per day and it is doubtful whether waterflood production from all operations of this kind in the state exceeds 3,500 bbl., which is about twice what it is in Kansas. Systematic flooding operations in Kansas and Oklahoma are closely related.

The possibilities of systematic water flooding in shallow Mid-Continent pools were indicated by experimental work initiated in 1931 in the Nowata field, Oklahoma, which was continued by Donald P. Oak, now associated with Darby-Lynde Co., and H. J. Walter, in the successful operation of projects near Chanute, Kans., which are conducted on a larger scale than any others in the state. However, during several previous decades, scattered water flooding had been practiced at various points, particularly in Chautauqua County; this took the form of letting water into producing formations by leakage of water through corroded casing from upper formations, lifting casing and ripping casing. In 1935 when the state Corporation Commission began to require that permits be obtained for water flooding, one of the first to obtain a permit was the firm of Denman Brothers, which operates a considerable amount of production in Chautauqua County. Another flood in operation in 1935 was the one undertaken by York State Oil Co. in the Seeley pool, Greenwood County, which has been operated on a small scale with 12 oil wells and 4 input wells in the Bartlesville sand at 1,963-2,033-ft. depth. A spacing of 660 ft. has been used which is greater than that generally found in the state.

During the first 3½ years, about 150,000 bbl. of oil were produced by injection of 1,200,000 bbl. of water. During April the project produced nearly 140 bbl. per day.

Within a year after the starting of York State's pioneer venture in systematic flooding, a major company undertook the flooding of 1,200-ft. Peru sand properties in Chautauqua County on a substantial scale. This was not a case of water flooding as a means of secondary recovery since this particular area was developed especially for producing oil by water-flooding methods, from the beginning, as a means of primary recovery. This water-flood project was later discontinued because it was found to be unprofitable.

The most important water-flood operations in Kansas are located in eastern counties where there are numerous shoestring-sand pools.

Oil has been produced in eastern Kansas for more than 50 years and most of the properties now being water flooded were originally developed more than 30 years ago.

The most prominent operators of systematic flooding in Kansas have come from Pennsylvania and Oklahoma; a few are Kansas producers who have applied this method after observing what has been accomplished. In addition there are several operators who are carrying on experimental flooding with a small number of wells. Altogether, more than 200 permits for water-repressuring projects have been issued by the state Corporation Commission of Kansas. Most of these permits are for properties where the primary object is water disposal in the formation from which oil is being produced in the conventional manner. However, there are several instances where production has been increased in the vicinity of such input wells. For disposal, the usual practice is to have water flow into these disposal input wells without the application of pressure.

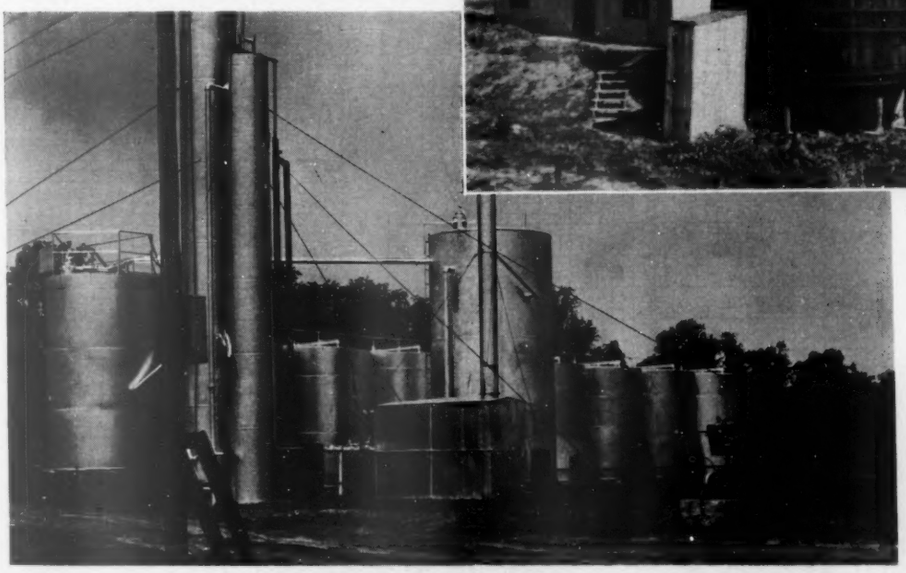
Before water flooding was undertaken in the southeastern counties of Kansas, operators from Pennsylvania and Kansas examined records and did coring for the purpose of selecting properties which held promise of being the most favorable for water flooding. A number of properties were acquired where sand formations 25 ft. and more in thickness were to be found at shallow depths. In coring, some unusually long cores of unbroken sand were procured. Sands in the most active water-flooding areas of Kansas are found as follows:

Field and county—	Depth, ft.
Moran, Allen	700-750
Alba, Allen	640-690
Matson, Melvin and Towne, Allen	790-864
Burghart trend, Neosho	720-840
Chanute, Neosho	700-765
Centerville, Linn	360-380
New Albany, Elk	530-560
Garnett, Anderson	670-700
Bush City, Anderson	600-650
McCune shoestring, Crawford	315-340
	250-300
Stanton-Rantoul, Miami	345-365

Although most of these sands are referred to as Bartlesville, some of the operators' designations are Prue, shoestring, Squirrel and Peru.

Recently there has been a growing interest in the possibilities of shallow fields in the vicinity of Osawatomie and Rantoul in Miami County. Operations in this area were described in "Water Flood Proves Successful in Miami County, Kansas," by Dal Dalrymple, The Oil and Gas Journal, May 16, 1940, Page 105.

There has been a definite slowing down in the



Above: Water-treating plant of Kirby Oil Co. in Chanute, Kans., area. Left: Tank battery and equipment for removing water on the Ingraham lease of Darby-Lynde Co. and H. J. Walter, near Chanute, Kans.

development of new water-flood projects in Kansas during the last 2 years, even though there has been a definite increase in water-flood oil production. Development has been retarded principally by the marketing situation existing in the eastern counties; parts of the gathering system of one major pipe-line system have been purchased by local operators. In some instances outlets must be sought through local refineries. In one case a water-flood producer transports his oil to a major pipe-line system through 6 miles of 4-in. line laid by the producer.

Those who have watched the situation closely believe that when the reluctance of major purchasers is removed by a generally improved crude-oil market, there will be a pronounced expansion of water-flooding activity in Kansas. At the present $1-a-barrel crude-oil market, good properties have been known to pay out in 2 to 3 years. Where ideal conditions existed, a pay-out has been possible in a year. Considerable flooding of shallow sands is ahead because the possibilities of water-flooding sands at depths of less than 1,000 ft. have not been fully exploited. There is considerable discussion of the opportunities for effective flooding of deeper sands with wider spacing which may make it possible to flood at nearly the same development cost per acre as that experienced in shallow sands.

Most projects in the area are flooded with water supplied by pumping from streams. Some projects use a brackish water found at a depth of 900-1,000 ft. in the Mississippi lime. A source of water which promises to be exploited more extensively in future flooding in Oklahoma and Kansas is the Arbuckle formation. It has been noticed that when operators have changed from using surface water to using formation water, there has been an increase in oil production. Hydrogen sulfide in brine from the Arbuckle formation can be easily dissipated. Stabilization of brines is accomplished by methods used in the field for several years.

Some of the significant practices employed in water flooding may be briefly reviewed by mentioning what is done in the locality just east of Chanute which today is the outstanding area in Kansas flooding.

Water is pumped from the river, in most cases, by centrifugal pumps and treated with sodium aluminate, lime, copper sulfate, and chlorine. After passing through filters, the water is pumped to intake wells. One operator injects at a pressure of 750 lb. Another operator who has undertaken flooding operations there in the last year started flooding with 300 lb. pressure; this was increased to 680-90 lb. but pressure later decreased to 520 lb. plant pressure when water increased in oil wells to an unsatisfactory extent.

Successful flooding is conducted in this locality with the injection of slightly less than 10 bbl. of water to produce 1 bbl. of oil. Because of the difficulty in removing water from the 33-34° A.P.I. gravity oil produced there, it has been found necessary to treat the oil with chemicals and pass it through special treating and settling equipment in which heat is applied throughout the year. During winter months it has been also found necessary to use burners under the stock tanks to heat oil to obtain water separation.

Wells are drilled on a five-spot pattern with spacing of 440 ft. (north and south) and 330 ft. (east and west). Coring is important in furnishing data for the development programs. This data is of special importance as a guide in shooting.

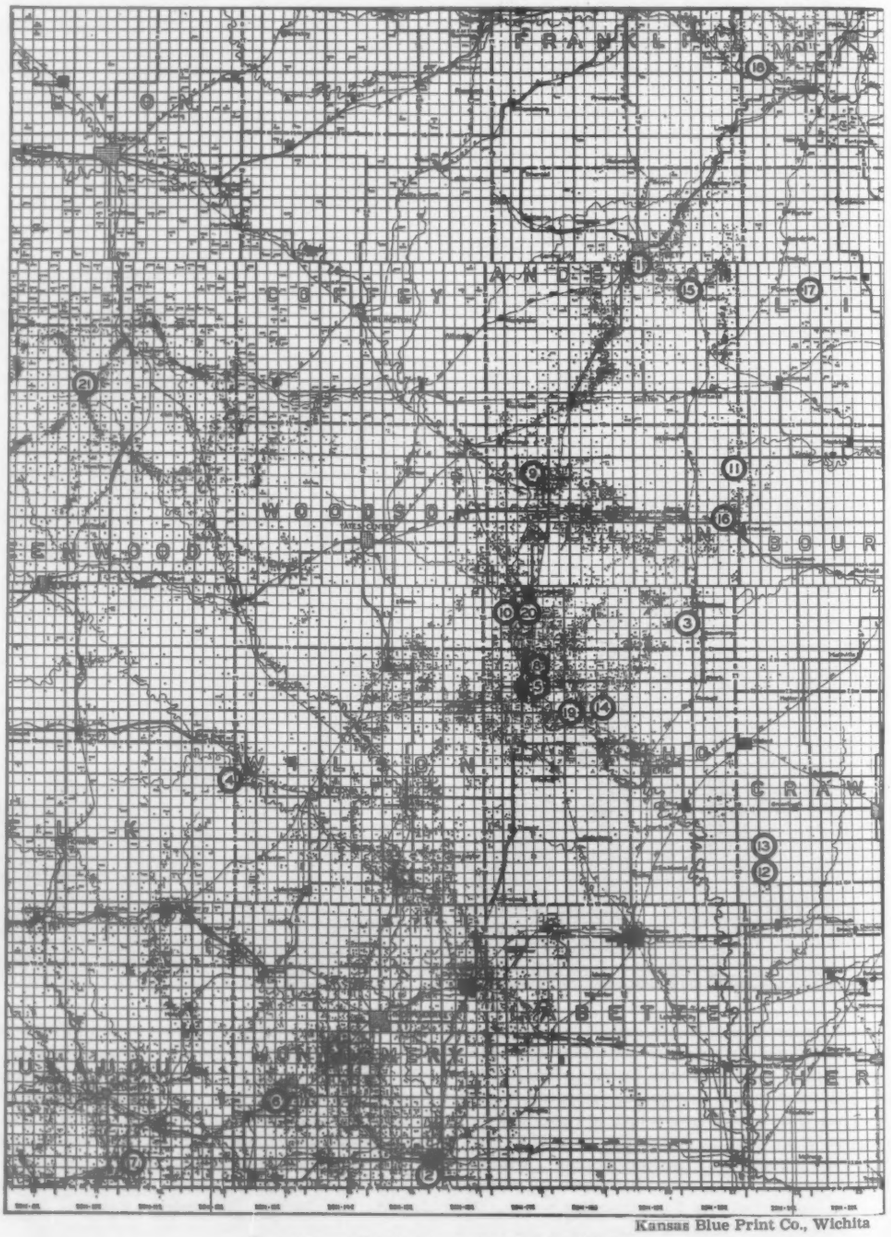
When flooding operations began in this area, 1½-in. tubing was used extensively but now 2-in. is generally used for both input and producing wells. Different policies have been followed in regard to plugging old wells. In some cases a substantial part of the old wells is allowed to produce after flooding starts until they make too much water; they are then plugged. However, preference is being given the policy of plugging many wells when operations are begun.

A few wells are flowed but the majority are pumped. In the area generally, old central power pumping equipment is continued in service but the leading operator in the area has equipped his most recent project with small jacks driven by 1½-hp. electric motors. Current is purchased from the municipal light plant. On the other side of the road this operator has a property previously developed for water flooding which is pumped with modern bandwheel power equipment.

Attention has been given to the effective use of packers, provision for back-washing producing sand and well-plugging methods.

There is considerable divergence of opinion among operators in regard to water-flooding practices. Lynn C. Converse and R. R. Hawkins, who have operated properties on the McCune shoestring, joined in presenting a paper at an A.P.I. meeting at Wichita Kans., which is entitled, "Some Practical Aspects of Water Flooding in Eastern Oklahoma and Kansas." This appeared in The Oil and Gas Journal, March 21, 1940, Page 54.

In conclusion it may be said that water-flooding methods applied by Pennsylvania operators are being modified and adapted for the flooding of shallow Mid-Continent pools to such an extent that practices are being developed which will find practical application in formations that are deeper than are now being exploited.



Kansas Blue Print Co., Wichita

Kansas water-flood projects (key to map below)

1. Brundred Oil Corp.
2. Comac Oil Co.
3. Conklin & Cooper
4. Cities Service Oil Co.
5. Darby-Lynde Co. and H. J. Walter
6. Forest Producing Co., Bragg
7. Forest Producing Co., Paulus
8. Kirby Oil Co.
9. Maire-Henton Oil Co.
10. Matson, Towne & Melvin
11. McIntyre & Travis
12. Max B. Miller, Inc.
13. Oil Recovery, Inc.
14. Penn-Way Oil Co.
15. Reed Oil Co.
16. Shell Oil Co., Inc.
17. Texas Co.
18. G. F. Vossler
19. T. B. Wilson No. 1
20. T. B. Wilson No. 2
21. York State Oil Co.

Most of Kansas' Output Comes From Water-Drive Fields

By EUGENE A. STEPHENSON
Head of Department of Petroleum Engineering, University of Kansas

AMONG the unique characteristics of West Central Kansas are the extraordinary number of pools which have been developed at practically the same depth (3,200-3,500 ft.), and which follow the northwest-southeast trend along the old plateau known as the Central Kansas uplift. These pools occur principally near the major unconformity or old erosion surface at the base of the Pennsylvanian series. Other noteworthy features are the prevalence of water-drive pools, as compared with an almost total absence of gas-drive pools, and the continued discovery of new pay horizons on the edge of old pools and in wells which were either not tested in drilling to the Arbuckle or whose productiveness was considered of minor commercial importance.

Due to the limited market demand and the relatively low price of oil, drilling has been voluntarily curtailed since the latter part of 1938, so that fewer wells were completed in 1939 as compared with 1938. In 1939 the number of oil wells was 980; gas wells, 55; and dry holes, 295. The percentage of dry holes in 1938 was 26.4 and in 1939 was 20.3, which may possibly indicate a progressive increase in the effectiveness of scientific exploratory methods. In view of the wider spacing which was practiced in 1939, the smaller number of wells drilled actually represents a greater developed area than was the case during 1938, with its larger number of wells spaced on smaller tracts.

In spite of curtailed drilling, the discovery of new pools averaged approximately two per month for the year 1939, besides an average of 1.5 new pay zones per month in fields already productive. Barton County continues to be the chief locale of new pools, as well as discovery of new pays in old ones. The total number of pools in West Central Kansas is now approximately 250.

Activity within the Forest City basin has been stimulated by the discovery of oil in commercial quantities near Falls City, Neb., just north of the Kansas State line. Several other wells have been drilled in the southern part of the basin, one of which, Mossbacker's No. 1 McLaughlin, showed 8,000,000 cu. ft. of gas per day at a depth of 1,425 ft., in the basal Pennsylvanian. Another well, R. J. Young's No. 1 McLeod, is producing small quantities of 21.4° A.P.I. oil from the Mississippi lime at a depth of 1,492-1,504 ft.

Operators in the basin have been handicapped by numerous fishing jobs, lost holes, and other difficulties. This is not an uncommon situation in areas where the development is altogether new, but once the existence of commercial oil has been demonstrated other operators usually surge in who are provided with adequate equipment and engineering personnel; hence it is highly probable that the basin will, in the near future, have the benefit of enough tests to ascertain its potential importance as an oil-producing territory.

Engineering Developments

While many of the problems of production engineering are not encountered in Kansas, such as heaving shales and extremely high formation pressure, together with the completion and operating problems which accompany these pressures, a number of developments have become almost characteristic of Kansas. Of these, the following are probably the most important:

1. Slim-hole drilling.
2. Increased portability, compactness and unitization of machinery for drilling purposes.
3. Trend towards other production methods than by the use of ordinary reciprocating pumps.
4. Increasing recognition of the value of edge and bottom water as agents in oil recovery.
5. General acceptance of the possibility that in water-drive pools wide spacing — within certain limits—is not only economically sound but may also result in as large per-acre recoveries as can be obtained from the long-established "rule of thumb" 10-acre plan.
6. Widespread use of draw-down methods—sonic reflection—for the measurement of potentials.
7. Increased use of wells drilled for the special purpose of salt-water disposal.

Reserves

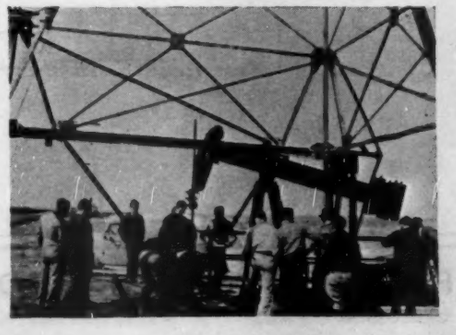
Little, if any, change in total proved reserves appears to have taken place in the past year, but it is believed that discovery of new reserves has at least kept pace with the depletion of older pools.

Slim-Hole Drilling

Several companies have been experimenting with wells drilled to a smaller diameter than the conventional size. Most of such drilling has been done with part of the rig assembly mounted on trucks equipped with extension or collapsible masts. The power is commonly derived from a single 125-hp. internal-combustion engine, with a similar auxiliary engine to operate the mud pumps. The diameters of the holes are 6¼ in. to 7⅞ in., cased with 4½ in. to 5½ in. o.d. pipe.

The principal advantage of the slim holes is the reduction in overall cost of the well. These savings result from both the smaller-diameter pipe used and from the reduction in drilling time. Many wells have been drilled, and the oil strings cemented at a depth of 3,400 ft. within 15 days.

It should be noted, however, that the slim hole leaves virtually no leeway for such contingencies as frozen pipe, compulsory reduction in the size of the hole, or for other mechanical difficulties, and that its lower cost may tend to provoke artificial reasons for close spacing, or unnecessary drilling, together with the inevitable consequences which result therefrom.



University of Kansas students taking productivity index potential on well

Mechanized Portable Units

Portable equipment, for both rotary and cable-tool rigs, is now available in surprisingly compact units. These are mounted either on truck or tractor bases with moving parts safely housed and controls conveniently located. Rotary-table speeds have been greatly accelerated in some experimental drilling, but most operators are averse to the use of high speeds where hard formations must be penetrated. One large manufacturer is experimenting with improved cable tools operating at such speeds as can be synchronized with the natural frequency of the drilling system. It already reports a reduction in drilling time of approximately one-third.

Pumps and Operating Practices

The present trend is towards smaller-diameter pumps, large enough to produce the allowable, but less expensive to install and to operate than the larger sizes. Slow-pumping rates are also in vogue, with the general recognition that longer pumping periods, at slower rates of withdrawal (expressed in barrels per hour), are less conducive to rapid water encroachment and are also more economical.

Electrification of entire leases continues, with a number of companies owning and operating their own generating stations. The largest plant is the 1,200-hp. unit of the Continental Oil Co. in the Graber pool.

Water-Oil Ratios

Just as the gas-oil ratio has gradually come to be considered a relative measure of the efficiency of production where the pool is under gas drive, so also the ratio of water to oil has become an index of the efficiency of production in water-drive pools. These statements need to be qualified somewhat by reference to the position of the well in relation to the geologic structure, and original oil-water and gas-oil contacts.

Owners of edge wells in each case find it difficult to produce their oil and not exceed the established limits of gas or water-oil ratios, a fact which has been generally (and generously) recognized by operators who are more favorably situated as to structure and who have usually agreed that the owners of the less favorably situated leases should receive consideration, if such a procedure would aid in conservation or increased ultimate recovery for the pool. It is not an altogether satisfactory, efficient, or equitable arrangement, but it is an overwhelming argument in favor of unit operation, voluntary (or compulsory), and such an agreement is far more conducive to efficient reservoir operation and control than one which substitutes volumetric withdrawals for gas-oil or water-oil ratio restrictions.

Proration

Under the modified conservation bill passed by the legislature in 1939, important changes were

(Continued on Page 82)

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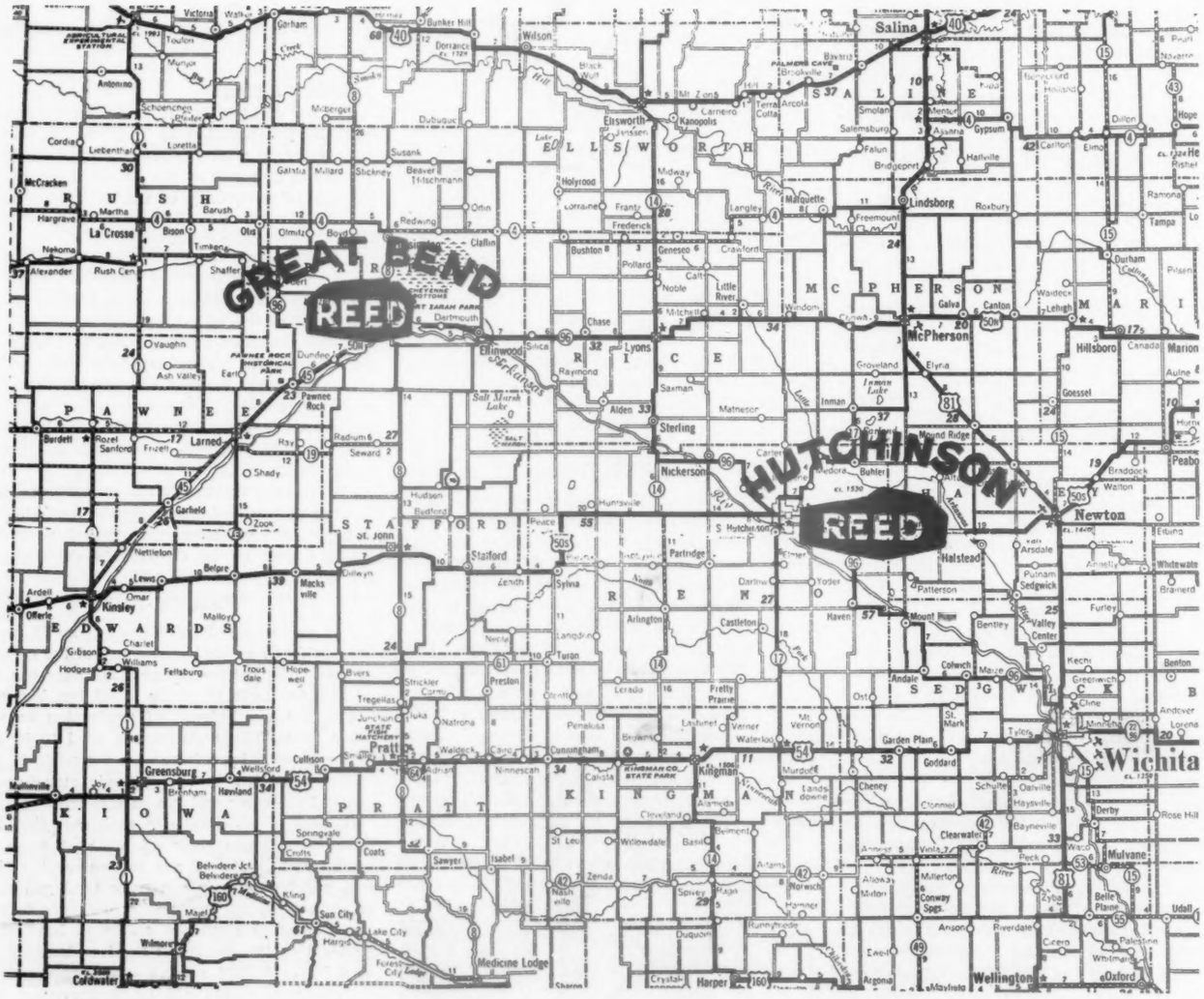

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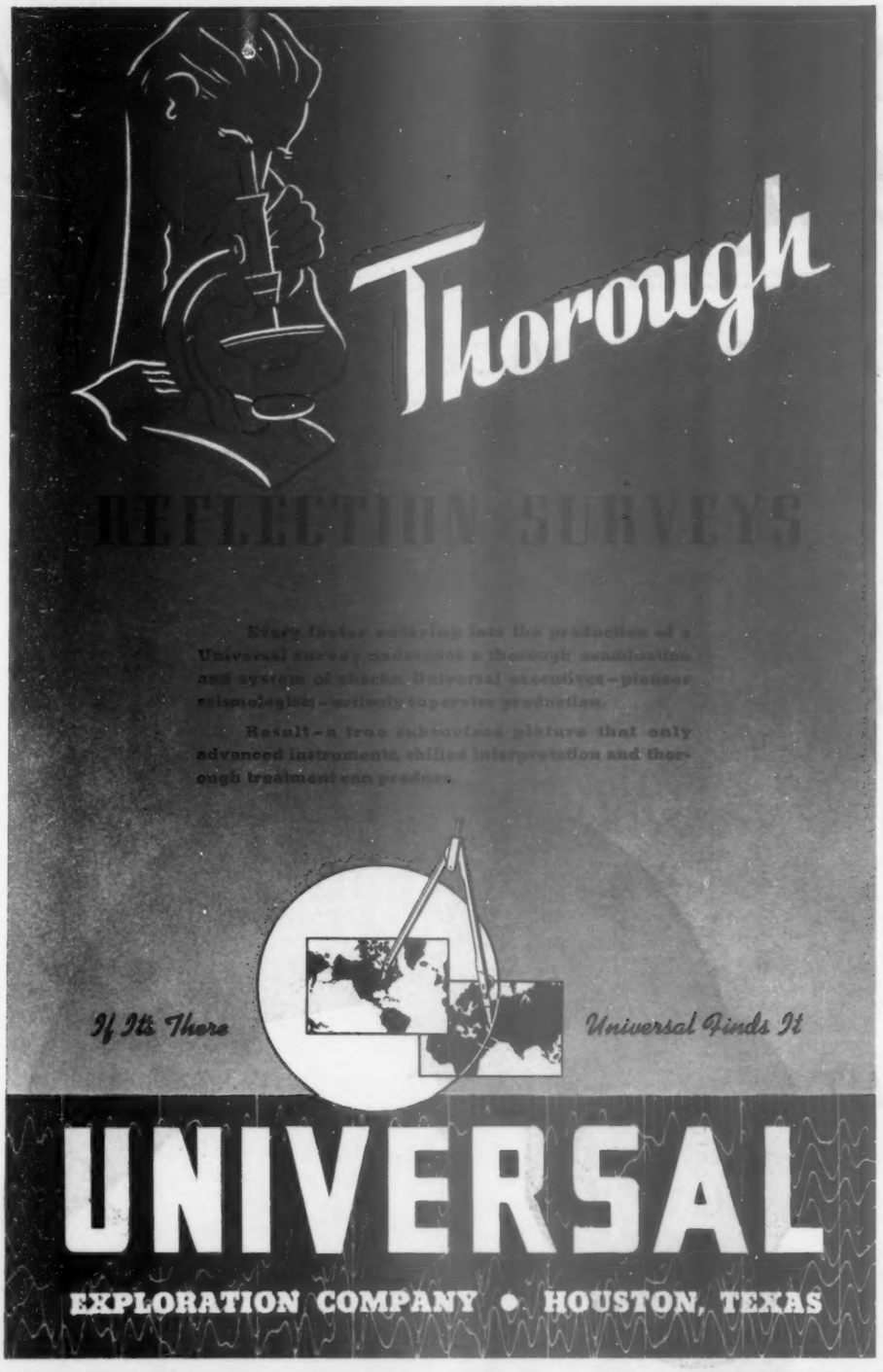

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made in the powers delegated to the state Corporation Commission. These changes make it mandatory for any person having the right to drill and produce oil from any common source of supply, to limit his current production to such a proportion of the pool outlet (which can be produced without waste, injury or discrimination) as would be represented by the ratio of the productivity of his well or wells to the productivity of all the wells in the pool, after giving due consideration to the acreage reasonably attributable to the various wells.

The new statute further provides that price shall be considered in the determination of market demand, that weight shall be given to the efficient use of the reservoir energy, and that unanimous agreements concerning development programs for proved or prospective pools may be approved by the commission.

In order to enhance the effectiveness of the new statute, the governor of the state, Payne Ratner, appointed, early in his administration, an advisory committee to function with the Corporation Commission. One of the first acts of the advisory board was to select a subcommittee to aid the commission in the formulation of new field rules and regulations. New rules were accordingly proposed, unanimously adopted by the advisory board, and recommended to the commission in the summer of 1939, and subsequently altered and put into effect as of December 1, 1939.

One of the most important sections of the new statute establishes allocation between pools on the basis of the average well productivities of the various pools, which in turn are determined by taking the sum of the productivities of the wells in any pool and dividing it by the number of wells. Allocations within pools shall be made after first allowing to each well, whose calculated allowable would be less than the minimum, the minimum, or so much thereof as the well is capable of producing. The balance of the pool allowable shall then be prorated among the other wells on the basis of their productivities, although not more than 20 acres shall be attributable to any well, unless the owners or operators of more than 50 per cent of the acreage within the pool make an agreement to the effect that more than 20 acres shall be attributable to a well, but even in this case the total amount per well shall not exceed 40 acres.

Potentials

An important section of the new field rules authorizes the use of the draw-down method for the determination of potential (echometer, depthograph, sonic reflection, or bottom-hole-pressure gage), although a physical test is permitted if the operator so prefers. So much publicity has been given to the term "potential" and the misunderstandings as to its significance are so widespread that attention should be called to the fact that potentials as measured by the draw-down, or bottom-hole-pressure methods, do not mean that the wells would actually produce the quantity of oil indicated by the potential figure. Unfortunately, however, that is the commonly accepted interpretation of the term among laymen, though not among operators and technical men familiar with the method by which such potentials are measured.

Potentials may properly be considered as theoretical quantities, which represent the amount of oil the well or wells would produce if the pressure in the well at the bottom of the hole, or at the face of the sand, could be reduced to zero; i.e. if the weight of the fluid column in the hole could be made equal to zero by removing that fluid from the well bore as fast as it entered, so that no oil reached the annular space between the tubing and casing. Viewed from another angle, it may be considered analogous to the productivity of the formation at the point where it is punctured by the well bore, although the limitations imposed by the capacity of the pipe and the re-

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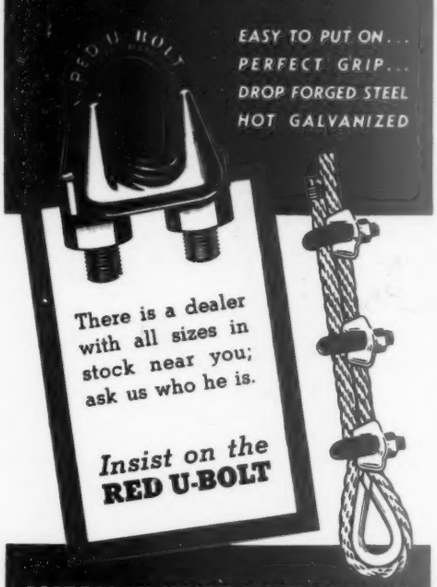

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sistance of the fluid to movement within the pipe make it impossible for the large wells to produce at rates which even approach the enormous theoretical potentials occasionally reported.

Still further, even though a well may be able to produce a large volume of oil during the short period of time represented by the potential tests, nevertheless, the well could not produce at such a rate for any prolonged period of time, perhaps even for a single day, without doing serious damage to the pay formation, due to the coning of water. Some writers have openly attacked the Kansas method of taking potentials and termed the results "fictitious," although such potentials could probably be better described simply as "theoretical well capacities."

In recognition of this fact, the operators have virtually all agreed upon some ceiling or top value for a well's potential, which, in many cases, is practically a measure of the limitations of the mechanical equipment. The latter practice is similar to the use of fixed diameter chokes at the well head, a procedure which tends to give wells with equivalent depths and equivalent well-head pressures the same capacity or potential through the chokes specified. A special merit of the latter method of taking potentials is that a substantial back pressure is maintained at the face of the sand—or pay—which, in turn, tends to prevent coning in water-drive fields.

Salt-Water Disposal

The disposal of salt water in such a manner as not to destroy or injure fresh-water supplies, or kill vegetable and animal life is nearly always a problem in water-drive fields. It is particularly acute in Kansas, since most of the pools are under water drive.

Disposal has heretofore been through earthen storage tanks, deep disposal wells, and repressuring wells. The trend today is definitely away from surface storage tanks towards disposal wells, due in part to the education of the operators, and in part to the excellent studies made by the sanitary engineering division of the state Board of Health. The Conservation Division of the State of Kansas listed 68 new salt-water disposal wells in 1938, with 50 additional wells drilled since January 1939. It is estimated that the quantity of water injected into deeper strata is not less than 60,000,000 bbl. per year, or 25 per cent of the total salt-water production.

Salt water which is restored to an oil-producing stratum below the oil-water contact, but close enough thereto to partially replenish the depleted hydraulic energy, has a measurable value in the production of oil. Therefore projects of this sort should be encouraged by operators, royalty owners, and legislative groups, even to the extent where some compensation would be made to the owner of the land on which a "dry hole" had been completed, if and when such a dry hole should be converted into a repressuring well. The beneficial results of repressuring an oil sand by means of gas have been thoroughly demonstrated by the operations of the Skelly Oil Co. in the Cunningham pool.

Since many of the Kansas brines are abominably corrosive, the treatment or conditioning of salt water is closely related to the question of disposal methods. Definite achievements in the solution of this problem have been made under the direction of Prof. T. H. Marshall, head of the department of chemical engineering at the University of Kansas. This research has involved the study of inhibitors, effect of circulating waters upon the speed of corrosion, production of completely oxidized brines, formation of insoluble precipitates, accurate measurement of losses in weight of pipe specimens in field use, and many related phases of this important type of depreciation. The investigations are still under way.

The writer is indebted to Max Mahaffey, of Cities Service Oil Co., to C. H. Keplinger, of Shell Oil Co., Inc., of Wichita, and J. H. Page, of the Kansas Conservation Division, for many helpful suggestions.

Geologists, Scouts Play Big Role In Kansas Development

(Continued from Page 67)

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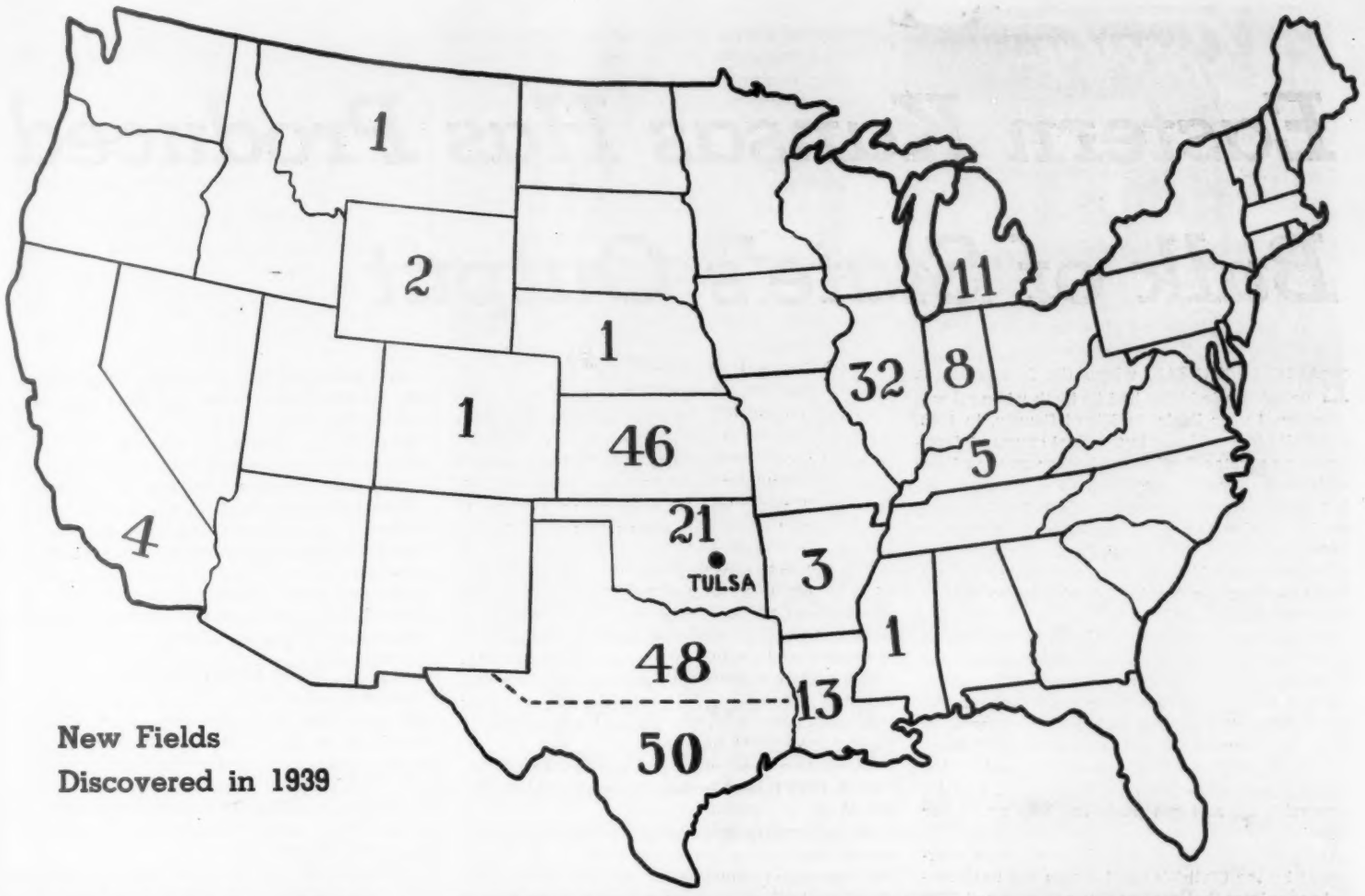

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Ten modern, thoroughly equipped hospitals are located here. St. John's is the largest, with 300 beds, Morningside next, with 225. There are a total of 1500 hospital beds available in Tulsa.

Fifteen clinics in the city specialize in both discovery and treatment of ailments of major character. Some of these clinics have developed reputations of almost national scope.

Tulsa has an exceptional safeguard for the health of school children in a modern clinic maintained by the Board of Education in a new building erected and equipped for the purpose.

For a summary of all facts which indicate Tulsa's stability as The Oil Capital write for new folder.

Kansas, in the past 6 to 8 months, has come to the front as one of the most active oil states. Wildcatting was particularly successful in Kansas, in 1939, when scarcely a week passed without one or more extensions or discoveries being recorded. Since January 1st of this year, wildcatting has continued to be equally successful, and drilling operations as a whole have been exceptionally active, running 50% ahead of last year. More than 300 wells are now drilling. Oil authorities state Kansas is entering upon the most active period in its history.

Note the comparative figures for the first 4 months of 1939 and 1940:

	Completions	Oil Wells	Gas Wells	Active Locations
1939...	326	227	14	734
1940...	469	382	13	1048

The important oil developments in Illinois and Michigan, in recent years, now augmented by the exceptional activity in Kansas and by Nebraska's modest entry into the ranks of the oil states—have greatly strengthened Tulsa's already secure position as the "Oil Capital." Tulsa's central position in the nation's oil activity is well visualized by the map above, enumerating new fields discovered in 1939.

It is easy to understand why Tulsa is headquarters for more major oil companies, more pipe line companies, more natural gasoline manufacturers, more drilling contractors—than any other city—and why those who sell equipment to the oil industry have made Tulsa a primary sales and distributing point. Tulsa is headquarters of 119 oil equipment manufacturers, 86 of whom have national distribution, 278 sales agents representing 1,028 out-of-state manufacturers here, and Tulsa has 183 oil industry supply houses. The Tulsa Chamber of Commerce will be glad to make a special report on the sales opportunity for *your* business in this city. Write fully to the Oil Activities Department.

TULSA
The Oil Capital of the World

Eastern Kansas Has Produced Bulk of State's Output

By DAL DALRYMPLE

EASTERN KANSAS, where the Mid-Continent petroleum industry had its birth when oil was discovered near Paola, in Miami County, in 1860, generally is considered in the final stages of development as water flooding and other means of secondary recovery are employed—and yet, persevering eastern Kansas operators will not admit their section of the state is through as an oil country. Year after year they continue to discover new pools, uncover additional pay zones and revive old fields through the application of modern production methods.

This section of the state, perhaps, more correctly called southeastern Kansas, includes Miami and Franklin counties on the northeast, all counties south of them, and extends westward to the meridian dividing the eastern and western ranges. It embraces the great Eldorado field of Butler County, the Hittle pool of big producers in Cowley, the famous shoestring fields in Greenwood, and innumerable oil and gas pools in these and other counties.

The search for oil in Miami County was interrupted by the Civil War and it was not until several years later that exploration was resumed. The title of "first commercial oil well" is disputed, and the exact date of the completion of such a well is clouded in the mists of history. Seemingly authentic records show that a 10-bbl. well was completed east of Paola, Miami County, in 1886, and it probably should be classed as the state's first oil well. However, other records designate a well drilled near Neodesha, Wilson County, completed in 1894, as the first "commercial" producer. Those early-day strikes resulted in the drilling of many oil and gas wells in the southeastern counties, the development eventually extending southward into Oklahoma. The Sooner State soon took the lead, and southeastern Kansas was relegated to the status of a stripper field, although operators in the older producing state continued to drill countless producing wells and to open many shallow pools.

Kansas again loomed large on the petroleum horizon and was recognized as an important oil state when the Eldorado field was opened in Butler County in 1915. This discovery led to the state's biggest boom, and was followed by widespread exploration and numerous discoveries in the western part of the southeastern district, principally in Butler, Cowley, and Greenwood counties.

The peak in drilling activity was attained in 1918, when some 3,750 oil and gas wells were completed, a record for which the Butler County fields largely were responsible. Western Kansas' greatest drilling record, made in 1937 when about 2,700 wells were completed, pales in comparison with that of the eastern Kansas peak.

The Eldorado pool had daily average production of 98,908 bbl. in November 1917. That was its production peak, but the figure was approached closely several times the succeeding year. Indeed, in 1918 the field's total production exceeded 29,000,000 bbl., which is more than any other Kansas pool has produced in any one year. In 1939, some 24 years after the pool's first complete year of production, it yielded 2,709,619 bbl. of oil.

Cumulative production at Eldorado, as of January 1, 1940, totaled in round numbers 174,635,000 bbl. of oil.

Despite that tremendous withdrawal, it still rates among the leading producing areas in the state. Daily average production for April 1940 was 7,312 bbl. from 1,643 wells. In the week ending June 8, 1940, it averaged 7,250 bbl. daily, being exceeded only by the Trapp, Silica, and Burrton pools in western Kansas.

Other Butler County pools averaged 6,536 bbl. daily in April, producing from 1,035 wells. This average has changed but little in the last year.

Second only to the Eldorado pool in eastern Kansas is the Augusta field, including both the North and South Augusta pools. First commercial production in Butler County was found in the Augusta area, the pool being opened in June 1914. This field attained its peak production in January 1917, when it averaged 42,084 bbl. daily.

Butler Leads the State

Butler County had produced, as of January 1, 1940, more than 304,000,000 bbl. of oil. This is a record that no county in the state seems likely to surpass, unless deep-sand production of major importance is found in some of the western counties. In addition to Eldorado and Augusta, other important Butler County pools include Elbing, Fox-Bush, and Weaver-Leon.

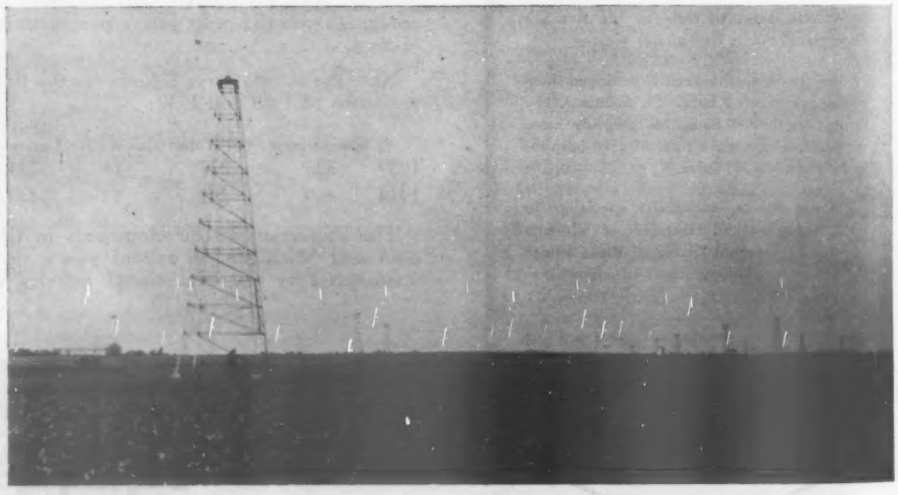
Production in the Eldorado, Augusta, and miscellaneous Butler County pools by years since 1925:

Year—	Production
1925	8,867,807
1926	9,934,084
1927	10,517,922
1928	9,690,889
1929	9,272,141
1930	9,099,075
1931	7,769,294
1932	6,684,285
1933	5,947,371
1934	7,196,558
1935	6,712,349
1936	6,163,823
1937	5,989,436
1938	5,693,802
1939	5,063,308
Total, 15 years	114,302,244

Both the Eldorado and Augusta fields produce from anticlines, and overlie the buried Nemaha granite ridge, a major geological feature which crosses the eastern part of the state from Sumner County on the Oklahoma border to Nemaha County, bordering Nebraska.

Cowley is another prolific southeastern county,

Pump and water plant on Layton Oil Co. lease near Garnett, being flooded with water by Brundred Oil Co.



A view of the Eldorado field, the Kansas area with greatest cumulative production, as it is today, some 24 years after the discovery

the first oil there being found late in 1914, in Section 36-32-4e, after some 250 dry holes had been drilled in the county. It was not until 1916, however, that important production was found with the discovery of the Winfield pool. Major development of the Winfield area did not begin until 7 or 8 years after the discovery.

Many Pools in Cowley

Since then, one or more oil and gas fields have been found in almost every township in Cowley County. The major development has been in the northwestern half of the county, where such large pools as the Rainbow Bend, Winfield, State, Weathered, and Hittle-Arbuckle occur. The Hittle-Arbuckle pool was discovered in June 1938 in an old shallow area in Section 21-31-4e, the discovery well making initial potential of 1,220 bbl. from the deep lime at 3,284 ft. Subsequently, some of the bigger producers in Kansas have been completed at Hittle. The June 1940 proration report lists 67 wells in the Hittle-Arbuckle pool with total daily potential of 244,355 bbl. In 1939, first full year of Arbuckle production, Hittle produced 1,132,129 bbl. under proration.

Production in Cowley County reached a peak of nearly 4,000,000 bbl. in 1926, when Rainbow Bend was at its height, and dropped to a low of 1,680,934 bbl. in 1934. New discoveries boosted the yield to 1,804,114 bbl. in 1936, and it was on its way up again. In 1937 total production was 1,973,594 bbl., in 1938 it was 2,318,218 bbl., and in 1939 it was 3,263,204 bbl.

Production in 1939 and cumulative production as of January 1, 1940, in the more prolific Cowley County pools:

Pool—	1939	Cumulative
Frog Hollow	214,215	284,000
Hittle-Arbuckle	1,132,129	*1,300,000
Rainbow Bend	370,250	12,652,000
Rock	162,000	1,528,000
Weathered	485,100	1,706,000
Winfield	115,500	10,178,000

*Estimated.

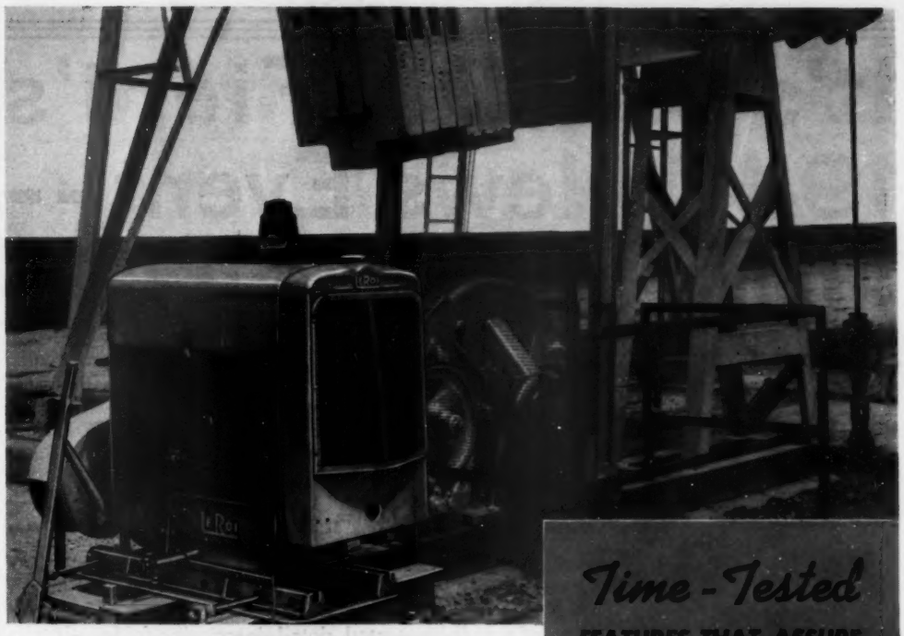
Cowley County producing zones include a shallow gas sand in upper Pennsylvanian, formations in the Shawnee group at about 1,500 ft., Kansas City horizons at around 1,900 to 2,500 ft., Bartlesville sand at 3,000 ft., and Arbuckle lime at about 3,300-3,500 ft.

Greenwood Rates High

Greenwood County ranks next to Butler in total recovery, with an estimated cumulative yield of nearly 130,000,000 bbl. as of January 1, 1940. The production records for this county, as of most of the other eastern counties, are incomplete for the early years, necessitating an estimate. The Virgil pool, with an estimated cumulative yield of 26,000,000 bbl., is the largest in the county.

Early production figures for the older eastern Kansas counties are estimated, as the pioneer operators were not bothered about proration or statistical records. An estimate for 21 eastern counties, including the big three, Butler, Cowley, and Greenwood, places the cumulative total at around 670,000,000 bbl.

There has been an aggressive revival of activity in the stripper districts of eastern Kansas in the last 4 or 5 years. In addition to a growing water-flood and repressuring program, this has included the discovery of several new oil and gas pools. The more notable discoveries are the Bartlesville sand development in eastern Wilson, resulting in new activity in an old shale-gas area; discovery of Arbuckle lime production in the Key pool, near Moline, Elk County, and in the Sedan district, Chautauqua County; opening of the Draper pool in Woodson County, and the subsequent townsite drilling campaign at Neosho Falls; production of diesel fuel oil in the Stryker pool near Fredonia, Wilson County, from a 250-ft. pay; development of the Davis-Beagle gas pool, Miami County; and other strikes of more or less significance in Crawford, Montgomery, Labette, Woodson, and Chautauqua counties.



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"Over 20 Years in Kansas"

It's the Oil Field's 1940 News Event -- Acme's MUD COLLAR

Once in a "blue moon," some new product, process or practice comes along, in every major industry, that sets everybody agog. It's news—*front page* or *feature story news*. Acme's new, perfected, proven MUD COLLAR is that sort of product. And its announcement that kind of event.

If you missed the Tulsa Oil Show, where Acme's new "wonder tool" was first exhibited and "held the spot light," you'll want to know ALL about it NOW. Every rotary driller, who's abreast of the times, *should* acquaint himself with this "next forward step." Write TODAY for your copy of a well illustrated, detail descriptive folder—it tells the whole convincing story.

Briefly: Acme's new "wonder tool" *is* a COLLAR, with rotary tool joint, used between the bit and drill collar. It houses a fluid "cylinder," from which 6 pressure streams flow over the bit, keeping it clean—preventing mud rings from forming. Delays in pulling out are thus practically eliminated. By keeping the bit clean, power consumption is reduced, cutting is faster, easier and smoother—making better hole, with less strain on drill pipe. All hazards of drilling—including time and money wasting fishing jobs—are greatly reduced.

Considering the grief this "Modern-day-marvel" tool can prevent—the wasted time and profits it can save—isn't it perfectly natural that it should be the "1940 *News Event*" for rotary drillers everywhere? The composite opinion of those who have seen it is: "Acme has again produced a winner — solving a long endured, costly problem."

Acme's MUD COLLAR is now ready for your inspection —your consideration —your dependable, *profitable service.*

Prominent User Says:

"We are highly pleased with Acme's MUD COLLAR. Ours has made about 14 wells to date, eliminating lost time and trouble from 'balled up' bits. It has been a great benefit on fishing jobs, as it prevents mud from channeling to one side of the bit. In fact, we have enjoyed so many benefits from its use, we now unhesitatingly recommend the MUD COLLAR to the entire Oil Trade." (Signed) T. B. Hunter, Vice Pres., Schoenfeld-Hunter-Kitch Drilling Co., Salem, Ill.

Acme Fishing Tool Co.

Parkersburg, - - - W. Va.

(Patents Applied For)

(1) Acme's MUD COLLAR—with bit assembled—ready to go into trouble-preventing, profit-protecting service.

(2) Acme's MUD COLLAR "in action." 6 Fluid streams keep bit clean.

(3) Acme's MUD COLLAR on the job—it has just come from hole "as clean as a whistle."

(4) Mud rings, like this, are "going out of style"—with Acme's MUD COLLAR.

Users are Saying—

(1) "Acme's MUD COLLAR paid for itself 3 times over by washing loose on fishing job, by circulating through fluid tubes."

(2) "Keeps bit clean so drill pipe turns 25% freer."

(3) "Can pay for itself on one well."

(4) "Acme's MUD COLLAR is a 100% tool. If you want to *keep out of trouble*—USE IT!"

Stratigraphy of Kansas

(Continued from Page 74)

tirely lacking in Kansas. Erosion that occurred in late Mississippian and early Pennsylvania times resulted in truncation of uplifted portions of the older rocks, developing a fairly smooth surface. The lowermost Pennsylvanian sediments deposited on this plain consist of sand, clay, and locally, residual chert and other pebbles that are included in the Cherokee shale or, in parts of the subsurface, the Sooy formation (Pennsylvanian basal conglomerate).

The chief subdivisions of the Pennsylvanian and Permian rocks are made on the basis of widespread but obscure unconformities that separate rocks having generally distinct type of fossils and lithologic features. These large divisions have generally been designated as series in survey reports and other papers of recent years. Present study indicates that they may more appropriately be designated as stages—a time-rock classificatory term that is next below that of series in rank. Thus, the Carboniferous system in Kansas comprises the Mississippian and Pennsylvanian series, and the latter contains the Des Moines, Missouri, and Virgil stages.

The successive stages are divided into groups and these in turn are divided into formations. Most of the Pennsylvanian and Permian formations have been traced entirely across the state along their lines of outcrop, and many of them have been traced in the subsurface to the northern, western, and southern state boundaries. Also, many of the formations have been subdivided into members, which are likewise very widely traceable in careful stratigraphic study. These formations and members, much too numerous for individual mention here, are treated in several reports of the Kansas Geological Survey and the state geologic map.

The Permian rocks, which have long been considered as a geologic system in publications on the geology of Kansas, have generally been divided into two main parts, the Big Blue series, below, and the Cimarron series, above. The Big Blue strata consist mostly of alternating limestone and shale of marine origin, resembling the Pennsylvanian beds. The Cimarron rocks, on the other hand, consist mostly of red sandstone and shale, but they include two or three widely persistent dolomite and anhydrite deposits. The Permian rocks of Kansas are now being divided stratigraphically into series corresponding to those established recently on the basis of western Texas type sections. These major divisions that are applicable to Kansas stratigraphy are, in upward order, Wolfcamp, Leonard, and Guadalupe. Beds tentatively assigned to the Wolfcamp include the Kansas Permian rocks to the top of the Herington limestone; the Leonard is considered to include strata from the Herington to the base of the Whitehorse sandstone; the Guadalupe comprises the higher Permian rocks of Kansas. Inconsistency in classing these Permian divisions as series appears in that they correspond in rank to such parts of the Pennsylvanian series as the Virgil, Missouri, and Des Moines stages. The problem in classification that is presented here calls for further study. Probably the Permian units mentioned should be classed as stages, rather than series.

Consideration of the late Paleozoic rocks of Kansas would be very incomplete without mention of the remarkable nature of cyclic sedimentation that is here observed. This refers to a regular order of succession of individual rock layers in a manner that follows certain very definite lines and that is very frequently repeated with striking fidelity. It is established that the reason for these cycles is the regular oscillatory move-

ments of advancing and retreating shallow seas that invaded the Kansas region. Recognition of various cyclic elements in the rock formations has furnished basis for a precision of stratigraphic treatment, both in surface and subsurface work, that would not otherwise have been possible. It is a factor that, combined with other features, makes stratigraphic studies in Kansas of unusual scientific interest, and at the same time of great practical importance.

Mesozoic Formations

Rocks of Cretaceous age are distributed throughout most of western Kansas, and with possible exception of a very small exposure in Morton County, in southwesternmost Kansas, no Mesozoic strata older than Cretaceous are known to crop out in this region. Jurassic formations have been identified in the subsurface of western Kansas, and it is probable that Triassic beds also occur. Collectively, the Mesozoic rocks form a major structural and stratigraphic unit, for they rest unconformably on an erosion surface that cuts across various Paleozoic rocks, and in places north of Kansas they lie directly on pre-Cambrian rocks. Maximum thickness of the Mesozoic strata in Kansas occurs in the northwestern counties. The regional dip of the Cretaceous rocks is generally northwestward and northward toward the area of greatest thickness.

The Cretaceous rocks are divided in three main groups—the Dakota, Colorado, and Montana. Subdivision of the Dakota group is difficult because of the irregular lenticular nature of the sandstones and other variations. Investigation of Dakota clays of Kansas, now in progress, indicates that the Terra Cotta shale, in the upper part of the Dakota group, is widely persistent in central and northern counties of the state.

Formations and members of the Colorado and Montana groups have been established on the basis of lithologic and faunal characters, which are mostly very regular and clearly defined. A feature of importance in the stratigraphic study of the thick shale and chalk formations has been identification and correlation of very numerous thin bentonite deposits that are distributed through this part of the rock column. The bentonites represent altered volcanic ash falls that apparently affected all of the Kansas region during the time of Cretaceous sedimentation. Each bed was formed in a very short space of time, geologically speaking, and identification of it from place to place serves reliably as a marker in determining associated deposits that correspond in age. Correlation of bentonite beds observed in different sections has been made very successfully by careful measurements to determine the intervals between the beds. Thus the Cretaceous, like parts of the Pennsylvanian and Permian beds in Kansas, has furnished opportunity for some very careful detailed stratigraphic subdivisions.

Tertiary and Quaternary Rocks

Formations in Kansas that are younger than the Cretaceous consist mostly of unconsolidated sands, clays, and gravels that are spread as a relatively thin veneer over large parts of the High Plains country and distributed along stream courses as valley filling. On first thought there appears to be little of stratigraphic importance in the geologically young, unconsolidated deposits of the Kansas region. Actually, the study of them reveals much that is of interest. The Tertiary deposits, most of which are included in the Ogallala formation, have been shown by M. K. Elias to be divisible into zones on the basis of different types of fossil grass seeds, and at some places there are rich deposits of fossil bones representing assemblages of extinct mammals. These fossils, and characters of the rocks themselves, give basis for division of the Tertiary strata into definable parts. The rocks called Ogallala will come then to be treated as a group, rather than as a formation.

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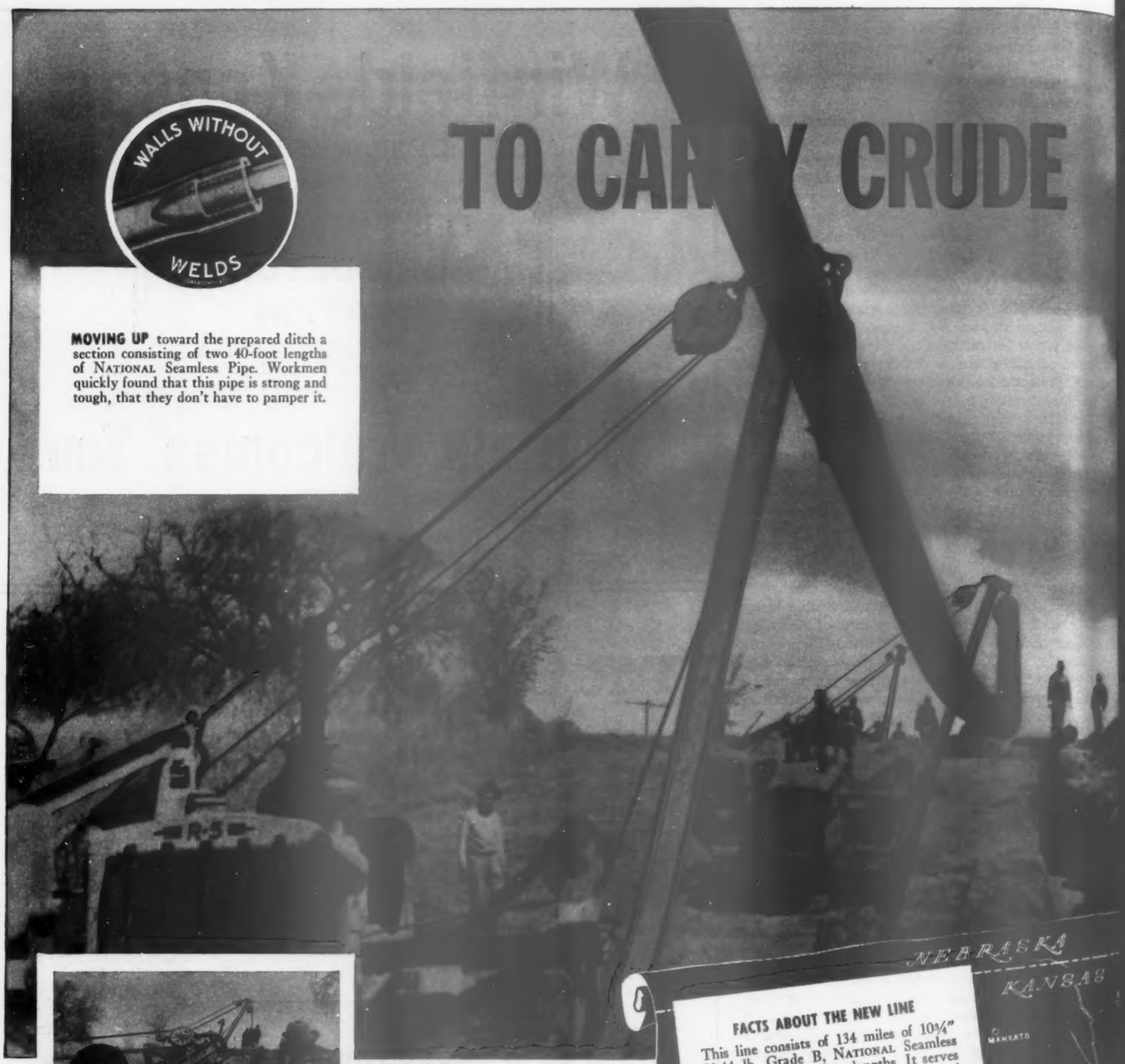

MOVING UP toward the prepared ditch a section consisting of two 40-foot lengths of NATIONAL Seamless Pipe. Workmen quickly found that this pipe is strong and tough, that they don't have to pamper it.

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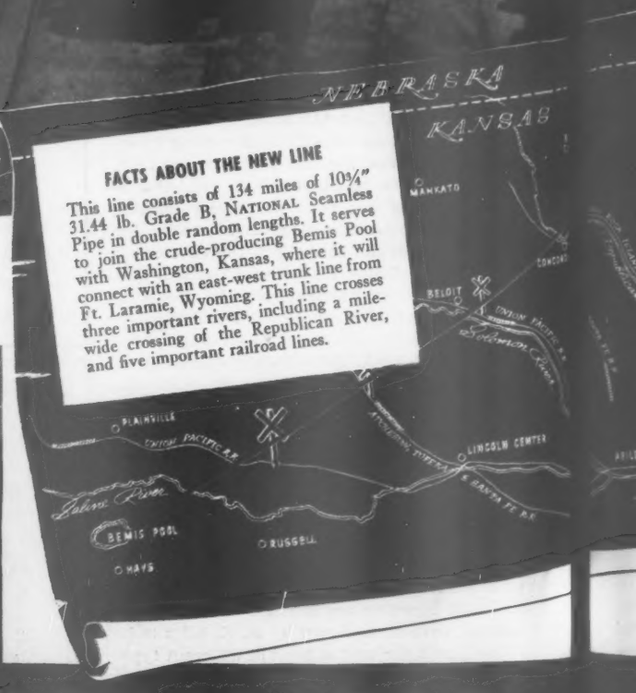
WELDERS moved right along on this line, and one reason for their remarkable progress was the fact that clean, accurately finished ends are a characteristic of NATIONAL Seamless Pipe. Equally adaptable to other types of joints.



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This line consists of 134 miles of 10¾" 31.44 lb. Grade B, NATIONAL Seamless Pipe in double random lengths. It serves to join the crude-producing Bemis Pool with Washington, Kansas, where it will connect with an east-west trunk line from Ft. Laramie, Wyoming. This line crosses three important rivers, including a mile-wide crossing of the Republican River, and five important railroad lines.

NATIONAL SEAMLESS

ACROSS THE KANSAS PLAINS

New National Seamless Pipe Line provides outlet for Bemis Pool

HERE'S another in the long list of important pipe lines constructed entirely of NATIONAL Seamless. Started early in March, this line is now in full operation, providing low-cost transportation for the crude output of Bemis Pool, to a terminal junction in Washington, Kansas.

Contractors and engineers associated with this project report that the quality of NATIONAL Seamless Pipe and the service behind it helped immeasurably in completing the job on schedule. National's organization maintained close check on all shipments, to prevent any delays due to lack of pipe.

This pipe itself helps speed any line-laying project. Its uniform wall strength and ductility make possible strong, accurate bends made right on the job. Its accurately bevelled ends facilitate welding. Its clean, smooth surface assures more perfect coatings and wrappings. And when a line of NATIONAL Seamless Pipe is once laid, you know you've used the best assurance against pressure stress, vibration, earth settlement, floods or other emergency conditions.

NATIONAL Seamless offers these advantages because it is pierced from solid billets of finest quality steel. It has no weld—no long line of potential weakness. "Walls Without Welds." Every length is as strong, as uniform, as perfectly formed as modern metallurgy can produce.

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United States Steel Export Company, New York

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CLEANING AND PRIMING in one operation. Since NATIONAL Seamless Pipe is always clean and smooth when it leaves the mill, it is easy to put in perfect condition ready for coatings and wrappings, where needed.

COATINGS and wrappings were applied to this line where it passed through damp or corrosive soils. NATIONAL Seamless Pipe is peculiarly well adapted to these treatments, because of its uniform, smooth surface.

THE DOPE GANG has finished its work here, leaving in its wake a strong, trustworthy line of NATIONAL Seamless, protected against corrosive soils, ready for years of profitable trouble-free service.

LOWERING into the trench, and finally, covering up, completes the job. This section of the line consists of lengths of NATIONAL Seamless Pipe welded together and bent to conform to the contour of the ground.

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Costs are low and the job is speeded when you run gas gathering lines with ARMCO Spiral Welded Pipe. Thousands of installations and a 10-year successful service record demonstrate its efficiency and economy. These are the reasons why so many oil men continue to specify ARMCO Pipe time after time in preference to other types.

Easily Handled in Long Lengths: When laying conditions permit, ARMCO Pipe is easily handled in uniform lengths up to 50 feet. Thus there are fewer sections to unload, haul and string; fewer joints to weld.

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J. C. JAMES, *Mgr.*

Large Gas Reserves Insure Many Years' Supply

(Continued from Page 70)

Milmac Oil Co. completed the discovery well at No. 1 Eitel, Section 11-18-15w. It was located on a surface structure mapped on Cretaceous outcrops. There are now 61 wells in the field. Some wells produce both oil and gas and there are three oil wells in the pool. There are five pipe-line outlets, being the lines of the Central Gas Utilities Co., Kansas Pipeline & Gas Co., Kansas Power & Light Co., Northern Natural Gas Co., and Producers Gas Co. The field is nearly drilled up, there being only a few proven locations remaining undrilled. Wells have been spaced one to 160 acres, until recently when a wider spacing has been employed. Some undeveloped tracts have been unitized with developed leases and the wells thereon have had increased allowables given them.

Most of the wells produce gas with some hydrogen sulfide content so that it is necessary to treat it before transporting it to market. Two sulfur-treating plants serving the entire field are operated by Northern Natural Gas Co. and Producers Gas Co.

Operations at Medicine Lodge

The Medicine Lodge gas pool in Barber County was opened in January 1927 at Barbara Oil Co.'s No. 1 Alexander, Section 13-33-13w. Location was made on surface structure with some subsurface information. Gas pay is found in the top or chat portion of Mississippi lime and in sandy-lime zones below the chat but in the upper part of the lime. Two wells found oil in Viola lime and one well produced oil from Simpson sand for a time. One company owns the entire developed field, carrying on operations in an orderly manner on spacing plan of one well to 160 acres. There are 33 producing wells and the operating company keeps one string of tools drilling additional wells most of the time. The Kansas Power & Light Co. and Zenith Gas Co. provide the pipe-line market for gas. Wells are drilled to top of the Mississippi lime where casing is cemented, and then are drilled in with cable tools. Some wells have been shot, some acidized. The field had a reported initial shut-in pressure of 1,625 lb. gage and present well pressure is 1,261 lb. However, single-well pressures still are as high as 1,584 lb. The largest initial open-flow volume was 50,000,000 cu. ft., and the smallest 1,000,000 cu. ft., the average size being about 11,500,000 cu. ft. There appears to be little, if any, water drive present and very little water is produced with the gas. With original pressure of 1,625 lb., there had been a drop of 364 lb. to January 1, 1940. Total production at that time amounted to 38,000,000,000 cu. ft., including 1,500,000,000 cu. ft. used for development. Dividing this by 364 lb. gives a yield of 104,000,000 cu. ft. per lb. pressure drop. Assuming an abandonment pressure of 300 lb., there are still remaining 961 lb. of available pressure, which, if multiplied by 104,000,000 cu. ft., would indicate a recoverable reserve of 99,944,000,000 cu. ft. Since the field is not fully defined, this figure may be revised as more data are secured.

Lyons a Seismograph Field

The Lyons pool in Rice County was opened in August 1936 when Atlantic Refining Co. completed No. 1-A Pulliam, Section 35-19-8w, in Arbuckle lime with open-flow volume of 150,000,000 cu. ft. and a shut-in pressure reported at 1,060 lb. A well drilled by Shell Oil Co. some 2 miles south of the Pulliam producer already had proven existence of gas on the Lyons structure but had mechanical difficulties and was not completed until 1939. Both tests were the result of seismograph exploration, which

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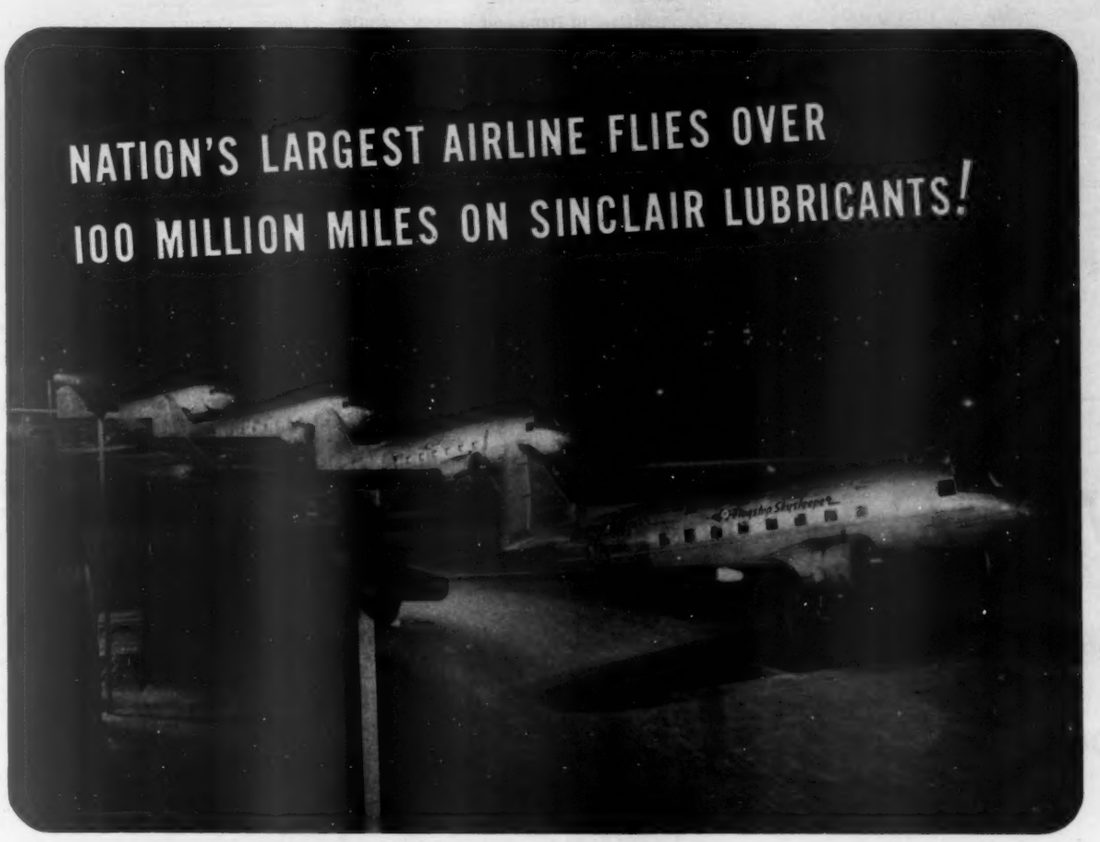

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found a buried structure that could not be mapped by surface geology due to lack of workable outcrops. Production is from Arbuckle and Simpson formations, one well producing from both pays. Ten wells have been completed. All Arbuckle lime gas contains considerable hydrogen sulfide, that from Simpson sand containing a small amount. The Cities Service Gas Co., which provides the only market outlet, operates a sulfur-treating plant within the pool, extracting the hydrogen sulfide and rendering the gas suitable for all purposes.

Many McPherson Pools

McPherson County has many gas pools within its borders, first production having been found in September 1926. Most of the gas pools have been drilled up for some time and while still containing large reserves, they all are on a decline at present. Nearly all the gas has been found in Mississippi lime and most of it has been associated with oil. The county still is quite important as a gas producer, but unless new pools are discovered it is doubtful if it has more than 75 to 100 billion cubic feet of recoverable gas reserves remaining.

The Burrton field in Reno and Harvey counties is the outstanding example of gas wastage in Kansas. Opened in April 1931, it produced gas in the chat, the majority of the wells completed in that formation producing both oil and gas. A great deal more gas was produced than could be marketed, resulting in a large amount of wastage. Some wells, completed with two strings of casing permitting separation of gas from oil, have produced and marketed a large amount of dry gas. If the Burrton wells had all been properly completed by setting casing between the gas and oil pays, a large part of the gas would undoubtedly have been preserved for future markets.

Conditions such as have existed at Burrton are not found in any of the newer oil and gas pools in Kansas, and the state has found the oil industry willing to assist in every way possible in carrying out gas conservation.

There are various small gas pools in western Kansas, the potentialities of which are not fully known. Commercial gas has been developed in Ford County in the only producing well in the county, no additional wells having been drilled owing to lack of market. The Pawnee Rock pool in Pawnee County has several large gas wells, the gas having been cased off for the same reason. Two small gas wells were reported completed in 1939 in Sherman County, in the extreme northwest portion of the state. These wells, while small in size, are important owing to their great distance from other production and also because they are reported to be producing from a sand of Cretaceous age, the first such production in the state.

Network of Pipe Lines

There are 23 natural-gas pipe-line systems in Kansas with a combined mileage of 9,165 miles of transmission lines with an estimated value of $80,000,000. Compressor stations, real estate and miscellaneous equipment of these gas companies have an additional estimated value of $40,000,000. There also are many individuals and small companies having short gas-transmission lines in the eastern portion of the state. A number of additions to existing pipe-line systems were made during 1939. The principal addition was 41 miles of 8-in. line from the Cunningham pool to Hutchinson, constructed by Cities Service Gas Co. The same company now is obtaining right-of-way for a proposed 12-in. line from Cunningham to Wichita, some 60 miles.

Kansas has 22 natural-gasoline plants with a capacity of 322,300 gal. daily. Of the 103 counties in the state, 53 have been found productive of natural gas and as more wildcat wells are drilled in search of oil there undoubtedly will be more gas pools uncovered in additional counties.

There are two carbon-black plants in the state which burn about 3,000,000 cu. ft. of gas daily each.

●

Pumping Troubles

Numerous dynamometer tests were run on wells in Kansas several years ago and tests are still occasionally run. The information gained has led to the elimination of most of the rod troubles due to poorly balanced units and pounding of the rods. The lack of gas in the oil simplifies this problem to a great extent as there is no trouble with gas pounding or locking.

Formation of paraffin in the tubing string and around the rods is a source of annoyance in many wells. Present method is to use a paraffin solvent in the wells to help eliminate unnecessary pulling of the rods and tubing. The solvent in most cases is lubricated into the well although some simply put it in the tubing and then let it settle to bottom. The solvent can then be agitated and when it is produced, pumped through the lead lines to help clear them. Often 50 per cent gasoline is used with the solvent.

The principal difficulties are due directly or indirectly to the water which accompanies the oil. It is for this reason that elimination of water or prevention of water encroachment is so important. Corrosion, treatment and salt-water disposal are all resultant problems caused by the presence of brine.

In more recent completions, less penetration of the pay zone and slower rates of withdrawal have been useful in preventing water encroachment from the water-drive reservoirs. In the older wells this becomes a serious problem as the disposal of brine costs between 1.25 and 1.50 cents per barrel. If other methods fail, and the well justifies it, the only remedy is to attempt a plug-back job in which cement is forced into the water-bearing part of the formation.

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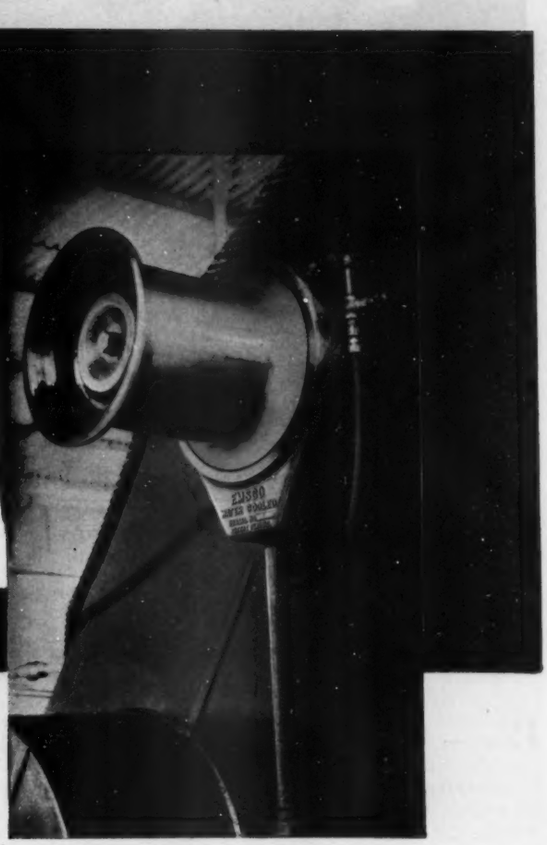

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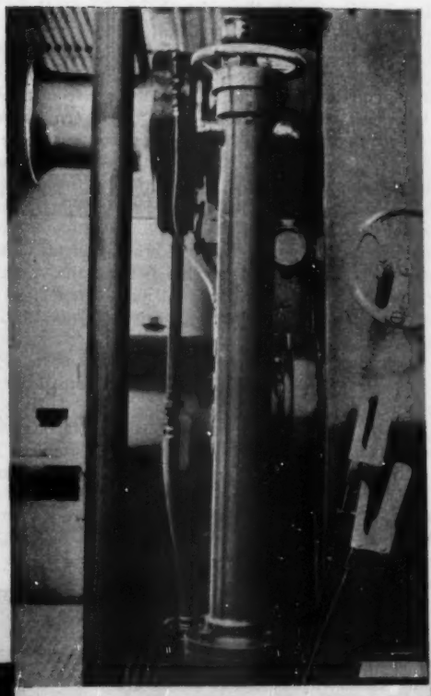

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Skelly Oil Co.'s refinery at Eldorado, Kans.

The insert map of Kansas in this issue shows the location of all the operating refineries in the state. A table which is part of the map gives refinery operating data including: name of company and plant location, daily crude oil capacity, type of refinery, cracking capacity and type of equipment.

20 Active Refineries in Kansas

REFINING facilities in Kansas for more than 40 years have been kept closely in balance with the state's crude production. At this time the crude runs to stills of 20 active refineries total 145,000 bbl. daily, about 15,000 bbl. daily under the current output of all of the state's wells. Some Kansas crude is moved both north and south out of the state and small quantities from Oklahoma are brought into the state, but through the years from 75 to 85 per cent of the state's crude output has been absorbed by the state's own refining industry.

In contrast to developments in several other sections of the Mid-Continent there has been a steady growth in Kansas refining facilities. The number of active plants is the same as it was 15 years ago but the refining capacity is approximately 50 per cent greater. Several of the larger plants have increased their capacities from year to year as more crude and market outlets became available.

The 20 refineries operating at this time have a rated crude-oil capacity of 172,200 bbl. daily and a cracking capacity of 93,240 bbl. daily. All but three of the refineries have well-balanced cracking operations—average yield of gasoline being about 54 per cent—well above the national average. Four of the refineries manufacture lubricating oils. Average yields of the other principal products are kerosene, 7.5 per cent; gas oil and distillate, 9.8 per cent; and residual fuel oil, 17 per cent.

Assuming that the state's refineries will maintain their operations at present levels the last half year the 1940 output of Kansas refineries will be:

	Barrels
Gasoline	28,500,000
Kerosene	3,990,000
Gas oil and distillate	5,190,000
Fuel oil	9,000,000
Lubricating oil	2,000,000
Wax (lb.)	22,000,000
Asphalt (tons)	150,000

In addition the state's refineries will produce small quantities of road oil and specialty products.

This refinery output far exceeds the local consumption so that Kansas petroleum products are sold in several states. It is estimated that the Kansas gasoline demand, which will be supplied largely by Kansas refineries, will total 12,000,000 bbl., a gain of 5 per cent over last year. This leaves a surplus of 16,500,000 bbl. which is approximately equal to gasoline consumption of Nebraska and Iowa or Nebraska and Missouri not including the St. Louis area.

In recent years many of the state's refiners have endeavored to concentrate the marketing of their gasoline and many other products within comparatively small areas. This is in contrast to conditions in the twenties and earlier when Kansas products were often shipped half-way across the continent.

Herein lies an important development in transportation in which Kansas refiners have pioneered. From many of the Kansas refineries and gasoline pipe-line terminals there is a constant stream, night and day, of tank trucks delivering gasoline, kerosene, tractor fuels and other products to points as far distant as Colorado and northern Nebraska and many points in Iowa. The resulting savings in transportation costs have enabled many plants to continue in operation. Truck transportation is also used in transporting crude from new fields to refineries. One plant in western Kansas obtains its entire supply from adjoining fields by truck.

In some cases trucking has been tied in with the construction of short gasoline pipe-line systems. Truck terminals are established on the lines at convenient points and trucking of products is carried on at points up to 100 miles from the terminals. In order to compete with this trucking development, an Oklahoma refiner has successfully operated a gasoline pipe line which crosses the state with one terminal in Kansas and one in Nebraska. The line was recently extended into Iowa to serve a large section in that state.

This "local" business in Kansas and adjoining states serves an agricultural area and the sale of products is not confined to gasoline. Kerosene and tractor fuels are widely used in Kansas and adjoining states and in some counties these sales are almost as large as that of gasoline.

The first permanent refinery built in Kansas was that of the Standard Oil Co. of Kansas at Neodesha. The plant, which for several years has been owned and operated by Standard Oil Co. (Indiana), has never been shut down. The refinery growth started in 1905 when three plants were built, followed by five plants in 1906.

The state's refining facilities have always been largely owned by independent companies. The only large integrated companies in addition to Standard of Indiana with plants in the state at this time are Sinclair Refining Co. with refineries at Coffeyville and Kansas City; Phillips Petroleum Co. with a refinery at Kansas City and Socony-Vacuum Oil Co., Inc., with a refinery at Augusta.

●

Fourteen Gasoline Plants

The fourteen natural-gasoline plants now operating in Kansas have a combined capacity of 379,500 gal. daily. The latest monthly report available showed that the average daily output of these plants was 175,000 gal. daily during April.

The natural-gasoline output of Kansas varies widely during the year because the bulk of the capacity comes from plants located on natural-gas lines. The output of several plants is directly dependent on the movement of natural gas, so that the largest natural-gasoline production in the state takes place during the winter months.

Because Kansas oil fields operate largely with water drive rather than gas drive, the natural-gasoline output of Kansas from plants located in the oil fields is comparatively small. In most of the fields of the state there is not sufficient casing-head gas available from oil wells to justify the operation of natural-gasoline plants.

Globe Oil & Refining Co.'s plant at McPherson, Kans.

Corrosion Is Problem

Corrosion of flow lines has been eliminated to a great extent by the use of asbestos or cement-lined steel pipe which will give several years' satisfactory service where ordinary steel pipe would have to be replaced a few months after it was installed. Similar pipe is used as tubing in salt-water disposal wells. When used aboveground, couplings are used for connecting the joints while screw-type collars are employed when the lined pipe is used for tubing. Lines for transmission of salt water prior to disposal are generally of asbestos composition.

Wooden treating tanks and sometimes wooden stock tanks are used by some operators. In other cases galvanized steel tanks, wrought-iron tanks, alloy-steel tanks and steel tanks coated on the inside with a corrosion-resistant paint are being used. If the water is removed in the treating tank the rest of the battery can be of regular construction without too much danger of corrosion. The practice in Kansas is to keep tankage to a minimum with one tank battery to a lease. Tanks may be either welded or bolted although the former are coming into favor because of their low moving costs.

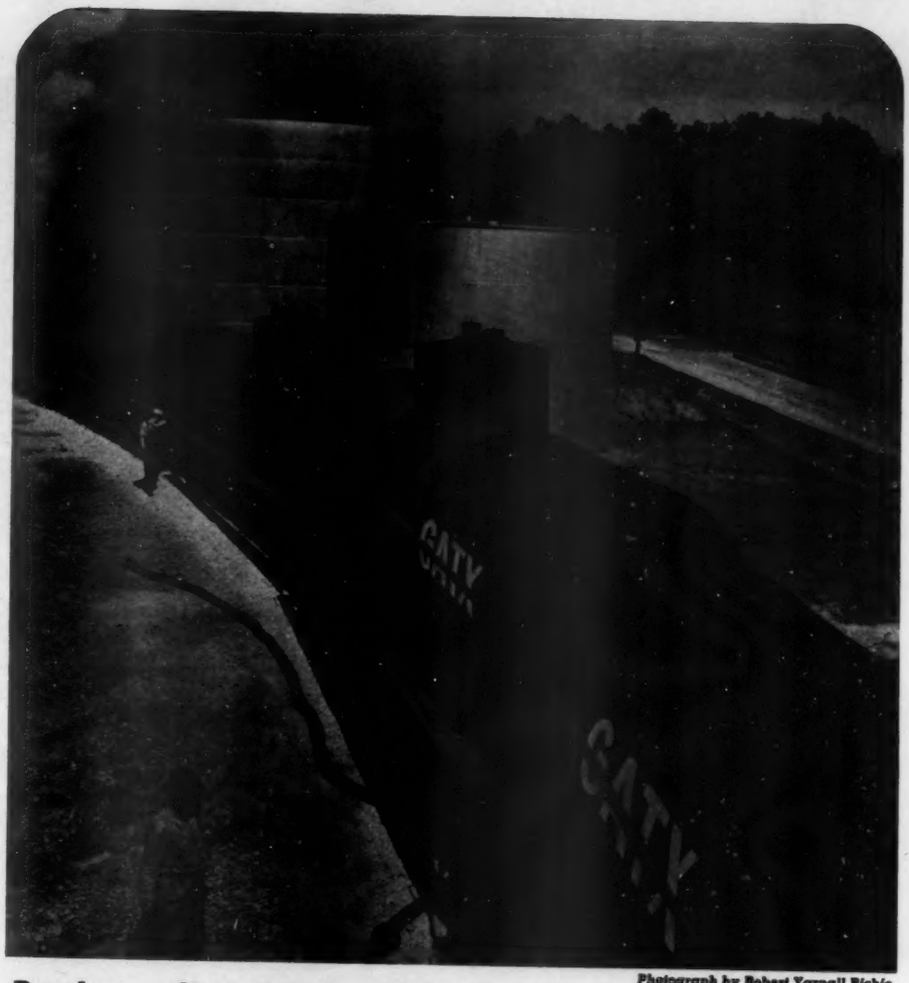
The combating of corrosion in wells has not been particularly successful and this continues to be a major problem. This is particularly true where wells which are making a considerable quantity of water are pumped off every day. In such wells the bottom 200 or 300 ft. of tubing may become so corroded that it will have to be replaced in a short time and the working barrel and traveling valve will become fouled due to the forming of rust or the deposition of scale.

May Be Electrolysis

Recently a series of tests were made to determine whether the corrosion in some areas was due to an electrolitic current but to date no announcement has been made concerning the conclusion indicated by this data. Direction of travel of the current seemed to be in different directions in different wells and the attempt to use a countercurrent was successful in too few instances. Efforts are still being made to solve the problem by this method, however.

Some chemical compounds which form a film over the metal, thus preventing contact of the metal with brine and air, have been used with some success, but the most consistently successful method has been the use of corrosion-resistant metals. Insert or liner-type pumps with close-fitting solid plungers have been used successfully, the barrel having a highly polished lining of chromium steel and the plunger being made from molybdenum steel.

Another device which has been successful in some cases, particularly where the well is not making over 50 per cent water, is an adjustable bottom-hole pumping choke. This method has also been used for the reduction in the amount of water lifted. The principle is the same as a bottom-hole choke on a flowing well, the production of the well passing through an orifice which is adjustable by turning the rod string. Oil may thus be allowed to flow into the annular space and tubing over a 24-hour period while the actual pumping operation may be carried on only a few hours. Perforated tubing, packing and seating nipple are run on the tubing while the adjustable choke is run on the bottom of an insert pump and seated. The choke is installed in the well in a closed position and after a pumping test has been made to determine the setting of the packer and choke, it is only necessary to lower the rod string until it engages the clutch on the choke and then turn the rod string to the right to open the choke as far as desired.



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Mississippian Limestones in Central and Eastern Kansas

By WALLACE LEE*
Kansas State Geological Survey

THE thickness of the Mississippian limestones in central and eastern Kansas bears a close relation to the geologic structure features of the state, and thus to the occurrence of the oil and gas deposits. The limestones of this age are widely distributed in the central and eastern portions of the state, though they are absent over large areas in the Central Kansas uplift and the northern part of the Nemaha ridge, as well as in many smaller areas in other parts of the state. They attain a thickness of 1,138 ft. in Clark County, but in most of eastern Kansas they have a general thickness of only 300 to 450 ft.

The Mississippian limestones include representatives of the Kinderhook, Osage, Meramec, and Chester series. They were deposited on a nearly flat surface on the Chattanooga shale. After their deposition they were gently folded and elevated and the subsequent erosion reduced the surface in pre-Pennsylvanian time to a nearly flat horizontal peneplain. Rocks lowered below the plain of base leveling were preserved; those that had been raised above it were worn away. There is, therefore, a close relation between the thickness of the Mississippian limestones and the folding that occurred during the time interval between the final deposition of the Chattanooga shale and the close of base leveling. In western Kansas the Chattanooga shale was not deposited and the Mississippian limestones rest on an eroded pre-Chattanooga surface, so that the thickness there is not so significant of structure as in eastern Kansas.

During the pre-Pennsylvanian folding of the Mississippian rocks, pronounced anticlines, such as the Nemaha ridge fold, the Voshell anticline and many others of less prominence were initiated. The base leveling appears to have been complete. Over 1,100 ft. of rocks were removed from the crest of such steep anticlines as the Burns dome and the Eldorado anticline. Erosion revealed the basement granite on parts of the Central Kansas uplift and the Nemaha ridge, but on most anticlines the Mississippian was not entirely removed.

During early Pennsylvanian time in eastern Oklahoma 18,000 to 20,000 ft. of Cherokee and earlier Pennsylvanian rocks were deposited in a gradually subsiding basin. The surface of eastern Kansas appears to have remained above sea level during most of this time, for only about 500 ft. of the uppermost Cherokee rocks overlapped upon the surface in Kansas. During this epoch, the previously eroded surface of the Mississippian, which had been reduced to base level, was gradually reelevated. The reelevation was accompanied by synclinal folding, which developed the northern extension of the Cherokee basin of Oklahoma and probably also the Forest City basin. During the same time, anticlinal movements rejuvenated the Nemaha ridge fold and there was a relative downward displacement on the east of 100 to 500 ft. Most of the other earlier anticlines and synclines were rejuvenated in varying degree.

The continued advance of the Cherokee Sea ultimately covered the region except for the northern part of the Nemaha ridge, the Central Kansas uplift, and the intervening area which were not submerged until Marmaton time.

The slow gradual deformation that was going on during the deposition of the early Pennsylvanian rocks in Oklahoma continued in some degree after the Cherokee Sea reached Kansas, and it continued to deform the later Pennsylvanian rocks by small increments of folding during their deposition.

Some erosion affected the parts of the surface that had not yet been submerged. Because the limestones contained many porous zones and the surface was covered by residual chert, and because the gradients of the surface were low, most of the rainfall escaped by underground channels and the surface dissection was relatively small.

The folds of determinable pre-Mississippian age

(Continued on Page 112)

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Kansas Oil Reserves Estimated at 750,000,000 Barrels

(Continued from Page 53)

It is not proposed to make any predictions regarding the trend of future reserves as shown by these tables. Each reader will probably draw his own conclusions. The past record of Kansas production has been one of continuously growing reserves and there is no indication at this time that this trend is being reversed.

TABLE 2—LIST OF POOLS COMBINED INTO FIELDS AND MISCELLANEOUS GROUPS IN TABLE 1

County, field or group—	Pools included
Barton:	
Beaver	North Beaver
Bloomer	Stumps, Heinz
Kraft	North Kraft
Lanterman	Rick, Eberhardt
Miscellaneous	Ernsting, Feist, Hagen, Hiss, Hoisington, Krier, Kluckenberg, Pospishel, Prusa, North Prusa, West Prusa, Rickard, Felters, Harzman, Davidson, Albert
Butler:	
Leon-Weaver	Stern, Garden, Haverhill, Kramer, Reynolds-Schaffer
Miscellaneous	Madden, Moore, Seward, Snowden-McSweeney, Steinhoff, McCullough, Benton, Brandt, Young, Bausinger, DeMoss, Gelwich, King, McCaig
Cowley:	
David	South David, Sherwood
Rainbow Bend	Gueda Springs
Rock	North Rock, West Rock
Winfield	Biddle, State
Miscellaneous	Murphy, Trees, Turner, Grand Summit, Smith-Schaffer, Baird, Countryman, Dexter, Dunbar, Elrod, Ferguson West, Frog Hollow, Mahanna, Olsen, Reidy, Udall, Wilson, Darien.
Ellis:	
Bemis	Cress, Shutts, Walters, Marshall, Hadley, Koblitz
Miscellaneous	Richards, Fischer, Blue Hill, Emmeram, Victoria, Kraus, Catherine, Haller, Peavey, Penny Wahn, Solomon, Toulon, Ubert
Ellsworth:	
Miscellaneous	Schroeder, Wilkins, Helken
Greenwood-Woodson:	
Teeter	Atveo-Pixley, Browning, Scott
Polhamus	Wilkerson, Teichgraber
Virgil	North Virgil, Winterscheid, Quincy, Lamont, Funkhouser, Dunaway
Seeley-Wick	DeMalorie-Sowder, Madison, Hamilton
Miscellaneous	Blackwell, Bradfield, Brinegar, Christie, Climax, Gaffney, Henley, Hinchman, Reece, Wiggins, Schwab
Harvey:	
Miscellaneous	Sperling, Hesston, Showalter
McPherson:	
Miscellaneous	Canton North, Lindsborg, Roxbury
Reno:	
Miscellaneous	Abbyville, Buhler, Yoder, Greenvale, Nickerson
Rice:	
Chase	Haferman, Keesling, Ploog, Empire, Byers, Brandenstein, Cramm, Soeken, Proffitt
Silica	Wenke, South Silica, Ellinwood, Clawson, Wolf, Marchand, Knop
Wherry	East Wherry, Ponce, Saxman
Miscellaneous	Campbell, Doran, Midway, Rickard, Galt, Bredfeldt, Guldner, Sterling
Russell:	
Gorham	Big Creek, Dumler, Neidenthal, Sullivan, Vaughn, Benso, Milberger, Petersen
Gurney-Hall	Allon, Letsch, Michel, Schneider, North Hall
Trapp	Coralena, Eichman, Karst, Sellens, Anschutz, Balta, Fairfield
Miscellaneous	Smoky Hill, Ochs, Boxberger, Donovan, Dubuque, Foster, Gideon, Steinert, Williamson
Sedgwick:	
Miscellaneous	Andover, Bentley, Cross, Kuske, Oakville
Stafford:	
Miscellaneous	Drach, Bonham, Snyder, Sittner, Max, Rattlesnake, Jordan, Leesburgh, Kipp
Sumner:	
Miscellaneous	Anness, Latta, Rutter, North Vernon, Zyba

TABLE 3—ESTIMATED ULTIMATE PRODUCTION AND RESERVES BY COUNTIES

(In thousands of barrels)

County—	Date of first production	Estimated ultimate production	Rank	Past production to 5-1-40	Rank	Estimated reserves	Rank	Peak year
Butler	1916	350,720	1	298,137	1	52,583	5	1918
Rice	1924	238,387	2	72,207	4	166,180	1	1936
Russell	1924	184,871	3	63,725	5	121,146	2	1937
Greenwood-Woodson	1916	166,656	4	131,068	3	35,588	7	1926
Eastern	1889	165,839	5	136,187	2	29,652	9	1920
McPherson	1927	103,002	6	63,466	6	39,536	6	1934
Ellis	1928	86,852	7	12,690	14	74,162	3	1939
Cowley	1914	73,843	8	44,752	7	29,091	10	1925
Barton	1932	71,472	9	11,079	15	60,393	4	1937
Reno	1927	60,668	10	33,219	11	27,449	12	1935
Sumner	1915	57,016	11	40,704	10	16,312	14	1928
Sedgwick	1928	56,255	12	43,276	8	12,979	15	1929
Marion	1919	45,752	13	42,433	9	3,319	17	1921
Stafford	1930	38,909	14	7,643	17	31,266	8	1939
Ellsworth	1930	33,863	15	13,578	13	20,285	13	1936
Harvey	1922	28,530	17	19,853	12	8,677	16	1934
Miscellaneous	....	35,385	16	7,777	16	27,608	11	....
Total		1,797,920		1,041,694		756,226		1937

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UPSTREAM HALF CORE HELD RESILIENTLY AGAINST CASE PROTECTS SURFACES FROM SAND AND GRIT

MISSION MANUFACTURING COMPANY
HOUSTON, TEXAS
NEW YORK EXPORT OFFICE: 30 ROCKEFELLER PLAZA

Rotary and Cable Tools Used In Kansas Drilling

(Continued from Page 49)

creases, with the maximum used being in the neighborhood of 30,000 lb. Some contractors prefer to use light weight while others allow their drillers wide latitude in the use of weight. Most contractors run a reamer just above the bit with a 30-ft. drill collar above the reamer; others reverse the position of the reamer and drill collar. There are a few rigs equipped with 60 and 90-ft. drill collars.

Speed of rotation is kept down for several reasons, the main one being, as pointed out previously, the damage to the drill pipe. High speeds also wear the bits more rapidly than the increase in footage would justify and the small number of bits used per hole is partially due to fitting the rotative speed to the conditions encountered. Another important factor is the size of the pumps, the volume of fluid delivered to the bit not being great enough to carry away the cuttings if a high rate of penetration is obtained. Kansas drillers have thus reduced the costs of drilling by taking into consideration all of the factors affecting the drilling operation.

The difficulties of keeping the mud properly conditioned are not numerous, one of the principal ones being the lack of satisfactory water as a satisfactory mud cannot be made naturally when salt water is used. In some areas formation salt going into solution will increase the weight of the drilling fluid but at the same time make it difficult to maintain the proper viscosity, 4 to 6 seconds above water as measured by a funnel viscosimeter. Bentonitic muds, hydrated lime, and other conditioning materials are used to preserve the colloidal suspension of the contaminated mud; some contractors shut down after drilling the salt sections and allow the salt water to separate from the mud and then jet it from the pits.

Porous limestones often occasion some trouble due to the loss of circulation, but this can generally be cured through the addition to the mud of fibrous materials and increasing the viscosity. As thin mud (weight of 9.5 to 10.5 lb. per gal. and viscosity of 34 to 36 seconds) is generally used in the effort to keep drilling time to a minimum, occasional trouble may be expected from stuck pipe due to water loss in the mud.

At present there are two developments which affect the size of hole and casing run to different depths; one is a local problem, while the other is common to the entire state.

The large number of fields producing from two or more formations which have been developed in the past several years has made it necessary to devise some method of testing and producing these formations through one well bore. With the small holes now in vogue it is impossible to set the 4½-in. pipe in one of the upper pays (the Kansas City-Lansing for instance), test or produce that formation for a time, and then drill to the lower pay. This has led to the drilling of the wells to the lower pay zone and then running the casing with a section of removable pipe opposite the potential pay zones as shown by the electrical log.

After the lower zone has been tested or produced, the hole can be plugged back and the upper formations tested. The alternate to this method is to drill an 8¼-in. hole to the Kansas City-Lansing, set 7-in. casing, and test the well. After it has been proven unproductive or exhausted, the hole can be deepened to the Arbuckle by drilling a 6¼-in. hole and running 4½-in. pipe.

A local problem is presented in the Bemis-Burnett area where an artesian salt-water flow is encountered in the Dakota sandstone. The practice in this area is to drill a 17¼-in. hole to 70 ft. and set and cement 12¼-in. casing. Below the surface casing to the top of the anhydrite at 1,100 to 1,150 ft. an 11-in. hole is drilled and 8¾-in. casing set and cemented. The balance of the hole to 3,500 ft. is drilled with 7⅞-in. bit and 5⅞-in. casing set and cemented.

The wells are equipped with a blowout preventer on surface casing as the salt-water flow will have a pressure up to 100 lb., depending on the surface elevation of the well. The mud is weighted up to 15 lb. per gal. and fibrous material added to prevent the salt water flowing into the well bore. This leads to another difficulty as the sand is sharp and light and is recirculated, thus increasing the wear on the bit.

Cable Tools

As small strings of pipe are set in top of the pay, the rigs used for completion must be equipped with small tools, 3½-in. being the most common. About 5 days are required to bail the rotary mud from the hole, drill the plug and about 25 ft. of formation, swab, and acidize the hole. If more acid is desired, the time is increased.

Ordinarily, 96-ft. derricks are used for drilling the rotary hole and they are left up for the standard cable-tool rigs. There is an increasing number of unitized cable-tool rigs, with masts and spudders are often used for completion. These do not require a derrick.

In areas having a high pressure, such as the Zenith field in Stafford County and the Bornholdt in Rice and McPherson counties, 125-ft. derricks are used for the rotary drilling and left over the hole as this permits the use of a lubricator

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for getting the cable-tool stems and bailer in and out of the hole.

The cable-tool rigs have been modernized and some have been mounted so the walking beam, pitman, samson post, jack posts, band wheel, sand reel, clutch, countershaft and internal-combustion engine are all mounted on one skid. An alternate to this method is to have the engine and countershaft on one skid, the sand reel on another skid and the remaining equipment, with the exception of the bull wheels, on another skid. These can all be set on framing sills or framing skid. The bull wheels have been skid-mounted and can be installed in a few minutes. They are generally bolted down and turnbuckled like a rotary hoist.

Drilling time with cable tools has been steadily reduced over the past decade by improvement in wire lines and better steel in bits and stems. A long spiral bit has been useful in keeping the holes straight and also in mudding off caving formations. Another innovation has been the underdigger which will permit a string of pipe to be carried through several water sands. This tool is run through the casing and expands when drilling is started, thus allowing the casing to follow.

Pipe pattern in one area is to drive one or two joints of 20-in. pipe, run 15½-in. pipe to 350 ft. in a 19-in. hole, run 500 ft. of 13⅜-in. pipe to 500 ft. in a 15-in. hole, run 10½-in. pipe in a 13⅜-in. hole to the top of the anhydrite at about 800 ft., run 8¼-in. pipe in a 10-in. hole to 2,450 ft., and run and cement 6-in. pipe in an 8-in. hole. Recovery of the big pipe is easier if bentonitic mud or shaly mud is run behind the pipe.

Most of the trouble in cable-tool drilling is occasioned by the caving formations, a black and blue shale at 2,100 to 2,400 ft. giving the most trouble. The water below the anhydrite also causes some delay. Caving is prevented to some extent by the addition of salt to the drilling water.

As much of the drilling is in hard lime, considerable damage to stems and bits results. Pins will be jumped occasionally, but by close inspection damaged tools may be found and sent to the shop before a fishing job results.

●

Drawdown Methods of Taking Potentials in Kansas

(Continued from Page 64)

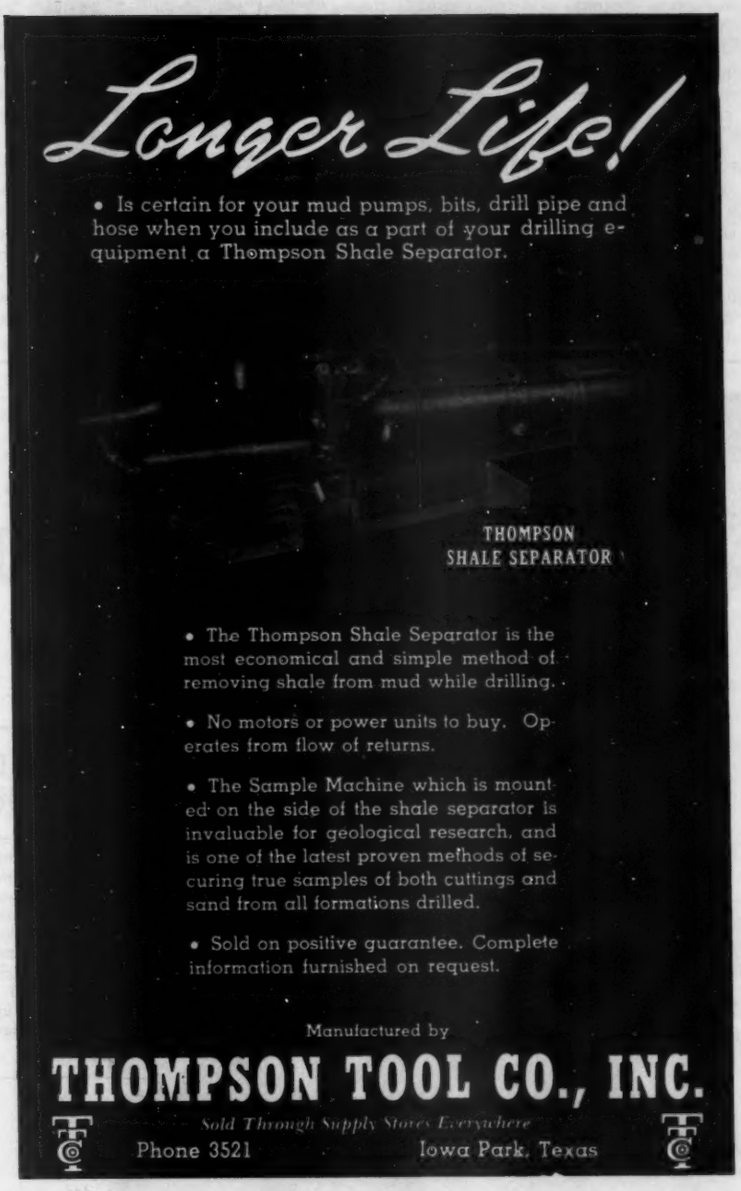
water level has formed and many wells that were "wet" to some degree during physical potential tests are now producing clean oil. This is true both during their current-production time and on drawdown tests. The economy of raising less water, less deterioration of equipment and greater ultimate yield is perhaps the one outstanding bright spot in Kansas production during 1940.

Of lesser magnitude, but directly visible, is the resulting economy in size of physical equipment. Casing programs have been reduced, thereby reducing drilling costs and time. Surface equipment, readily able to handle the production for long months to come, has been installed with costs cut by halves or more. Today a 10-hp. pumping unit and small tubing is adequate for daily operation and periodic testing where previously 40 or 50-hp. units were necessary.

Under the light-equipment setup an average production well in many Kansas fields costs in the approximation of $21,000, or a decrease of nearly 30 per cent. This could be broken down as follows:

Drilling expense	$9,100
Tubular goods	5,900
Administration	1,000
Producing equipment	4,500
Total	$20,500

This represents 9-in. surface casing, 5½ or 6-in.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Theory Checked

Verification of theoretical consideration is the lifeblood of engineering enterprise. It is no wonder then that the question has been frequently asked, "Has an exact check of the fluid-level determination ever been made against an actual physical test?" Obviously, the answer is "Yes."

On wells up to 2,500-bbl. class (wells within the reasonable capacity of the pumping equipment) many drawdown potentials have been carried through to ascertain a check. It can safety be stated that on many of the tests so conducted, a result within the limit of 5 per cent error has been so common that the men engaged in developing and utilizing the equipment for testing wells no longer doubt its validity. If efforts larger than 5 per cent are confronted, it is indicative that something in the equipment of the well is "haywire." Early in the history of sonic measuring, recording bottom-hole pressure bombs were run in the mud anchors as "check tests" against the sonic findings. Errors of less than 3 per cent were observed, and this verification gave impetus to the continuation of the drawdown investigation and its adoption.

Example of Results

The performance of a well located in Section 31-15-13, Russell County, Kansas, provides an example of application to present Kansas procedure. Originally completed in November 1936, the well was drilled too deep in the Siliceous lime pay. No subsurface repairs have been made to date. The initial physical potential of this well was taken November 22, 1936, and the rating was 2,439 bbl. of oil and 156 bbl. of water. The allowable daily production was relatively high and water grew to be a large part of the fluid produced daily. Subsequent retests were taken as follows:

Date—	Bbl. oil	Bbl. water
January 21, 1937	2,428	232
May, 30, 1937	1,080	465
January 1, 1938	265	Over 90%

On this latter date the well had long since become a "minimum allowable" producer and was a poor prospect. The only change made in the subsurface equipment was the substitution of a 1¼-in. o.d. insert plunger-type pump for the 2¾-in. i.d. common working barrel originally used. The only surface change was to reduce the stroke to 24 in. and the speed of the pumping unit from 20-24 s.p.m. to 14-16 s.p.m. This was done about May 1938.

Within 2 weeks a decline in the percentage of water was observed and over a period of 13 months the water production decline was steady until in June 1939 the oil production became entirely clean. These records are from periodic monthly water tests. Recently a new potential determination indicated the well to have a capacity of 3,408 bbl. and no water was found in the oil.

Clearly, the reason for the performance of this well is the slow rate of withdrawal, not only in this one well, but over the entire field during a sustained period. It is believed that no other remedial method could have accomplished this result and it demonstrates why many operators have found the determination of the drawdown method showing larger producing capacities now than many of the initial potentials showed.

The prolonged life and greater recovery of this one well, not to mention the lower cost of lifting and replacement in the equipment, will probably pay for the whole experimental cost of the drawdown method of finding potentials. If physical potentials had been taken in this field, even at 180-day periods, the results simply could not have happened. This well, and others like it, answers many of the skeptics and clearly demonstrates the real economies and benefits resultant from slow rates of withdrawal from the reservoir, a condition possible only under drawdown methods of measurement.

Conclusion

In conclusion, the drawdown method of measurement is a yardstick of well comparison and may also be considered a sort of stethoscope of the reservoir and the action of the underground equipment. With experience, the sonic meter becomes a silent detective. So impressed is a major operator or two that they are purchasing the "shooting trucks," not for state potential determinations, but for their own private periodic investigation of their wells' performances.

Production practice has been greatly improved by the adoption of the drawdown method of taking potentials. In additon to the scientific information which it makes available, economic and reservoir waste is reduced to a minimum.

Careful study of the collective well records on any lease is essential to find the best, and often least expensive, equipment that will satisfactorily handle the specific production problem in hand. Changes in rates of withdrawal in daily operation can often be made which will show economy in amounts of water handled, or the records may indicate necessary tubing changes in their depths or size, or recommend more economical gas-oil ratios to be obtained.

A final word of compliment is due at this time to the many employes of the service companies contracting this work, who have constantly striven to improve not only their equipment but their technique. The clarity of the records after 2 years' experience is noteworthy and has not occurred by accident.

Sizing Traps the ARMSTRONG Way

ASK FOR YOUR COPY OF THIS NEW BOOK

There is a new and larger edition of the well-known Armstrong Catalog and Educational Handbook on Condensate Drainage. This 36 page handy reference volume is a veritable encyclopedia of useful information about condensate drainage, heating, pipe sizes, hook-ups, and traps—profusely illustrated with photographs and diagrams and sprinkled with charts and tables.

A STEAM MAIN

EXAMPLE: A chief engineer has a 12 inch main supplying steam at 50 lbs. pressure to a processing department 175 ft. from the boiler house. He wants to drain all condensate from the main just before it enters the processing department. As the pipe is well insulated, the peak condensate load will come from warming up the pipe, itself, each morning when steam is turned on. The trap must be big enough to handle this peak load.

Table A on page 21 in the Armstrong book shows 1.42 lbs. of steam condensed for each foot of 12 inch pipe heated through a temperature rise of 228 deg. F. For 175 ft. of pipe, the total condensate is 248.5 lbs.

It is recommended that the warming up period be considered as 5 minutes. Thus, condensation is at the rate of (248.5 ÷ 5) x 60, or 2982 lb. per hour. With a safety factor of 2 to 1, the Armstrong Capacity Chart shows that a No. 214 trap should be selected.

IT'S easy to get a good installation every time when you use Armstrong traps! One of the fundamental reasons for this is that Armstrong gives you a concrete starting point: COMPLETE CAPACITY CURVES. These curves have been plotted painstakingly from hundreds of actual tests with HOT CONDENSATE and with the normal amount of pipe fittings in lines to and from trap. The Armstrong Capacity Chart is unique in that you can tell at a glance what capacity a given size trap will have when operating at any pressure below maximum. Such information is absolutely essential to do an accurate job of sizing traps for unit heaters that operate at two different pressures, for water heaters with thermostatically controlled steam inlet valves, etc.

The Armstrong Capacity Chart with full information about how to use it appears in the new Armstrong Steam Trap Book. We will be glad to mail you a copy on request and without obligating you in any way. Copies can also be obtained from your local Armstrong Representative. ARMSTRONG MACHINE WORKS, 868 Maple St., Three Rivers, Michigan.

Forest City Prospects Improved

By DAL DALRYMPLE

OIL has been found in Jefferson County in the Kansas sector of the Forest City basin and, while the initial well is a small producer and possibilities of the area it opens are undetermined, the discovery strengthens belief of many geologists and operators that the northeastern part of the state may yet become an important producing area.

In addition to the Jefferson strike, two shallow oil pools have been opened in Johnson County, on the south flank of the basin, and a half-dozen gas pools have been found as a result of the drilling campaign that followed the Forest City lease boom of 1938-39. The discovery of oil in Richardson County, Nebraska, a few miles from the Kansas line, gives further encouragement to those who have maintained their faith in the area despite the drilling of many dry holes.

More than 1,000,000 acres were leased in northeastern Kansas, an area favored by several major companies and independents who believed it offered better productive possibilities than other sectors of the basin. Several dozen blocks were taken, but much of the acreage was of checkerboard variety. As many of the leases taken in the early days of the play have low rental payments, they probably will be carried for several years regardless of development.

A Favored Area

Brown County, immediately south of Richardson County, Nebraska, was favored by some of the big companies. Magnolia Petroleum Co. took some 225,000 acres in Township 1s-15, 16, 17, and 18e, blocks and checkerboard spreads, in this county. Carter Oil Co. acquired leases on about 200,000 acres in the same county in Township 1s-17, 18, 19, and 20e. Other principal buyers in Brown County included Amerada Petroleum Corp., Pawnee Royalty Co., Phillips Petroleum Co., Sinclair Prairie Oil Co., and Skelly Oil Co.

Other northeastern Kansas counties sharing in the activity included Atchison, Doniphan, Douglas, Jackson, Jefferson, Johnson, Leavenworth, Nemaha, Osage, Pottawatomie, Shawnee, Wabaunsee, and Wyandotte. Companies participating, in addition to those mentioned, included Arkansas Natural Gas, Barnsdall, Deep Rock, Derby, Glimac, Indian Territory, Midland Oil, Mutual Oil, Northeast Kansas Exploration, Ohio Fuel Supply, Ohio Oil, O. K. Supply, Sagamore, and Vickers. In addition, many individuals took blocks and spreads.

The first basin wildcat to be started as a result of the new activity was in the Kansas sector, at W. M. McKnab's No. 1 Fritz, Section 4-12-14, west of Topeka in Shawnee County. It was spudded in January 1939 and was abandoned in June at 2,720 ft., after finding water in Wilcox sand.

The drilling campaign in Missouri greatly overshadowed that in the other basin states. Operations in the Kansas sector were fewer because of the state's strict proration rules and the fact that much of the Kansas acreage was held by major companies who were in no hurry to develop the area. Even so, several more or less important tests were started and it remained for the first oil discoveries resulting from the lease boom to be made in Kansas.

Two strikes in Johnson County were made almost simultaneously. One was at O. K. Supply Co.'s No. 1 Knabe, C NE NW Section 15-14-22, which opened the Gardner pool early in May 1939. It found oil in both Squirrel and Bartlesville sands and was completed at 856 ft. in Bartlesville sand for about 50 bbl. of oil daily.

The other discovery was at Sagamore Oil & Gas Co.'s No. 1 Metropolitan, SW SE SE Section 20-14-22, about 2½ miles southwest of the O. K. discovery. It also found Bartlesville production at 886-894 ft., and was completed for about 25 bbl. of oil daily.

Bartlesville Sand Well

B. F. Hammel and associates opened a gas pool in Section 4-12-24, finding pay at 497-520 ft. The Sagamore company opened a gas area in Section 29-14-22, about ½ mile southwest of its oil discovery, producing from Bartlesville sand at 761 ft. Joe Willinbring and others found gas at 610 ft. to open a pool in Section 17-15-23. The O. K. company uncovered a gas pool in Section 4-14-22 in November, and as the year ended F. J. Kasper, trustee, opened the Kaths gas pool in Section 33-13-22, with production in Squirrel and Bartlesville sands. Several additional wells have been or are being drilled in these areas or elsewhere in Johnson County this year.

While shallow discoveries were being made in Johnson County, some geologically deep failures were drilled in other parts of the Kansas basin. Arbuckle lime was found noproductive at a Douglas County wildcat in Section 4-14-18; at an Atchison County test in Section 17-6-20; and at Jefferson County wildcats in Section 8-9-17 and Section 34-8-19. Some northeastern Kansas tests also were drilled to Bartlesville sand and Mississippi lime without success.

The outlook for the Forest City basin was dark, indeed, in November 1939 when the first oil pool strictly in the basin was uncovered near Falls City, Neb., about 4 miles north of the Brown County, Kansas, line. That revived optimism, but a severe winter ensued and little field activity was possible until this spring. A few weeks ago a second well was brought in at Falls City for larger production than the discovery, and it now looks like a considerable drilling program is under way in southwestern Nebraska.

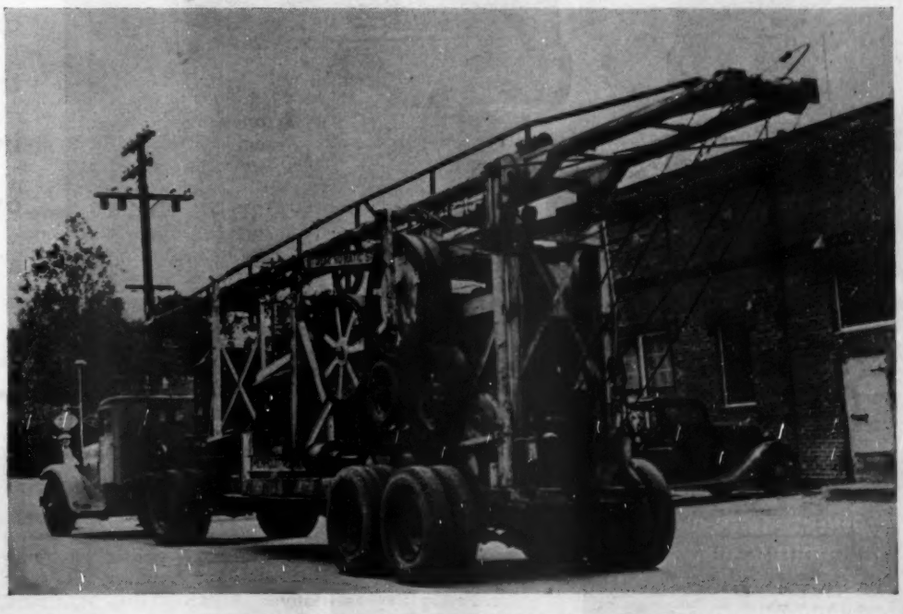
About 60 miles south and 25 miles east of the Falls City pool, the first oil in the Kansas basin was found late in May 1940 at Young & McLaughlin's No. 1 McLeod, C NW SW Section 4-10-20, some 6 miles east of Oskaloosa in Jefferson County. It pumped 70 bbl. of oil in 12 hours initially from Mississippi lime pay at 1,594-96 ft. Gravity of the oil was 21.3°. There was no water with the oil. The discovery had not been completed at time of writing, as operators continued to test. Location is ¼ mile southwest of a gas discovery well recently drilled by the same operators.

An Arbuckle lime test is just getting under way near Lawrence, in Douglas County, at S. W. Forrester and others' No. 1 Altenbernd, Section 35-12-20; additional wells are due to be started in the Jefferson County discovery area, and it is expected that wildcats will be started in Brown County and other sectors of northeastern Kansas this summer.

Many Possible Producing Zones

Those discouraged over results in the Forest City basin might take a lesson from operators in Cowley County. Some 250 dry holes were drilled in that single southern county before any production of importance was found. Today it is one of the more prolific Kansas counties.

Most of the formations that produce oil and gas elsewhere in Kansas are present in the Forest City basin, as are many of the strata that are productive in Illinois. Types of structure that have been responsible for storing oil and gas in some of the major pools of Illinois and Kansas are present in the basin. Many of the deeper wells that have been drilled have had good showings of oil and gas, although not in commercial quantities. Only a few tests have been drilled in the basin on sound geology and geophysics, and only a comparatively few of the tests have been drilled with modern equipment.



Moving large spudder to location for test in Forest City basin

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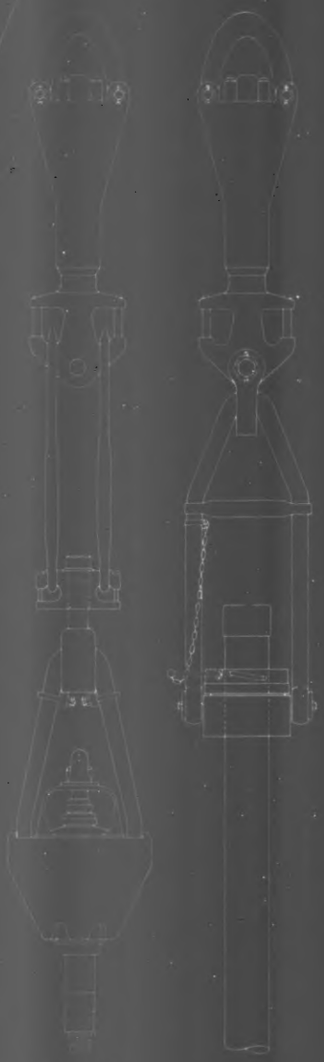

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Swivel carried in regular elevator by special adapter.

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The Ideal D-6 Connector can be furnished with a special coupling that eliminates the Connector bail and traveling block clevis, reducing the over-all length and providing a strong rigid unit assembly.

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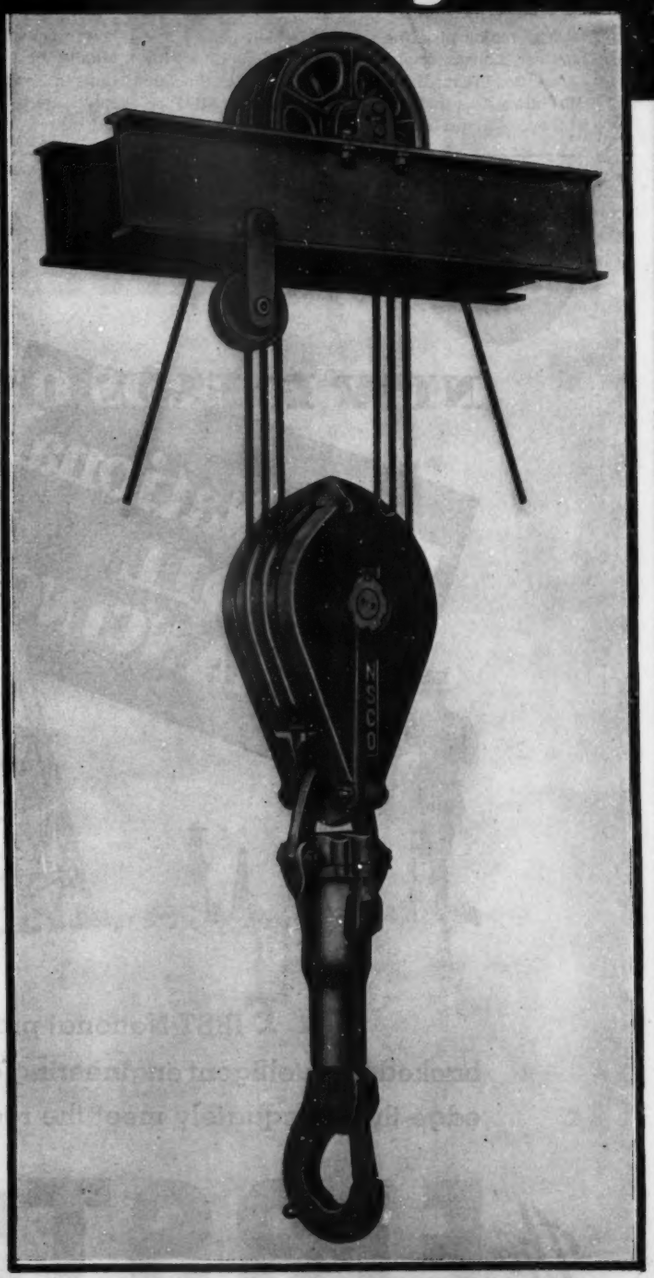

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When used together there is no flare in the line and the traveling block can be raised to a higher position than is otherwise possible. The combination of these blocks with the Type D-6 Connector saves valuable operating space in the derrick and insures maximum speed, safety and economy of operation.

The Ideal Type D-6 Rotary Hook is of the same capacity as the Ideal Type D-6 Connector, and except for the hook and yoke members, all parts are interchangeable.

BRIEF SPECIFICATIONS

Capacity, tons	60
Maximum size elevator links accommodated, inches	2¾
Number of locking positions	8
Clevis section at block clevis contact, inches	2x5
Spring travel, inches	7
Shank diameter, inches	3¾
Width over-all (across yoke member), inches	18¾
Height over-all, inches	72
Net weight, pounds	1070

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Kansas Fields Served by 17 Pipe Line Systems

The insert map of Kansas in this issue shows the location of the crude-oil, natural-gas and gasoline pipe-line systems in the state. A table lists the pipe lines by type and company.

THE oil fields of Kansas are served by a network of 17 large and small pipe-line systems. With the exception of refineries which truck the crude from the wells to plants, all of the refineries in Kansas either have their own gathering and truck-line systems or are connected to major systems which cross the state.

The major pipe-line systems which gather and deliver Kansas crude oil include Stanolind Pipe Line Co., Texas-Empire Pipe Line Co., Sinclair Refining Co. (pipe-line department), Shell Pipe Line Corp., and Gulf Oil Corp. Continental Oil Co. operates a Kansas system which delivers crude to its Ponca City, Okla., refinery.

The capacity of these major interstate pipe-line systems in Kansas exceeds 300,000 bbl. daily. They transport Oklahoma and Texas crude oil as well as Kansas crude. Before the revival of activity in Illinois, starting in 1937, it appeared certain that larger pipe-line systems serving refineries of the Middle West and East would expand their connections in Kansas to meet an increasing demand. The rapid increase in the production of the Illinois basin area has temporarily postponed that development. As Illinois production declines—an expected development for the last half of this year—these markets will return to Kansas and important extensions of existing pipe-line systems are anticipated.

Gasoline Pipe Lines

Kansas is crossed by two large gasoline pipe-line systems, and two refineries in the state operate their own pipe-line systems. The Phillips Pipe Line Co., operates a line which connects with its Borger, Tex., refinery with terminals at St. Louis, Chicago, and other points. Great Lakes Pipe Line Co., which connects to several refineries in Oklahoma also, has a connection to the Eldorado refinery of Skelly Oil Co., in Kansas. Gasoline of the Skelly refinery is delivered to terminals of the Great Lakes company located at Kansas City, Omaha, Des Moines, Chicago, and Minneapolis.

The Cimmaron Valley Pipe Line Co., owned by the Champlin Refining Co., operates a pipe-line system with terminals in Kansas, Nebraska, and Iowa. It connects to the Champlin refinery at Enid, Okla. The Derby Oil Co. operates a small gasoline line in Kansas, connecting to a trucking

CRUDE-OIL PIPE-LINE SYSTEMS

- Bareco Oil Co.
- Bay Petroleum Corp.
- Continental Oil Co.
- Derby Oil Co. (pipe-line department)
- El Dorado Refining Co.
- Globe Oil & Refining Co.
- Gulf Oil Corp.
- Kanotex Refining Co.
- Kaw Pipe Line Co.
- National Refining Co.
- Shell Pipe Line Corp.
- Sinclair Refining Co. (pipe-line department)
- Skelly Oil Co.
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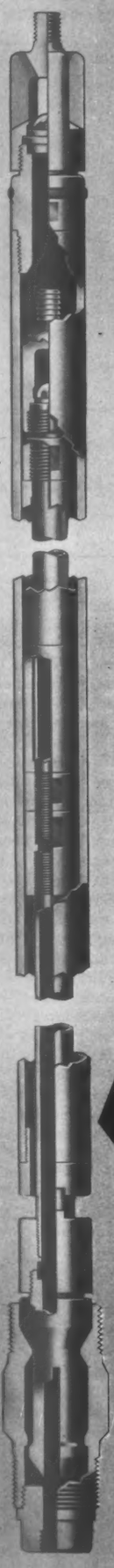

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Natural Gas

Kansas is one of the largest producers and consumers of natural gas and 13 trunk-line systems either deliver gas within the state or are part of interstate systems. As explained in a special article in this issue, Kansas has one of the largest proven natural-gas reserves in the United States with additions constantly being made.

The state is in need of larger outlets for its most important gas fields and these are now in prospect. A large part of natural gas now being produced is marketed within the state, including cities and towns just outside the state. The market in Kansas is steadily expanding due to the increasing domestic and industrial consumption.

●

Mississippian Limestones in Central and Eastern Kansas

(Continued from Page 102)

trend in a northwesterly direction. The original folds of the Mississippian rocks trend chiefly toward the north and northeast, although there is some continuation of the northwesterly trending folds. During the Cherokee and later Pennsylvanian time and during the Permian period, both sets of folds were active although northeasterly trending folds predominated.

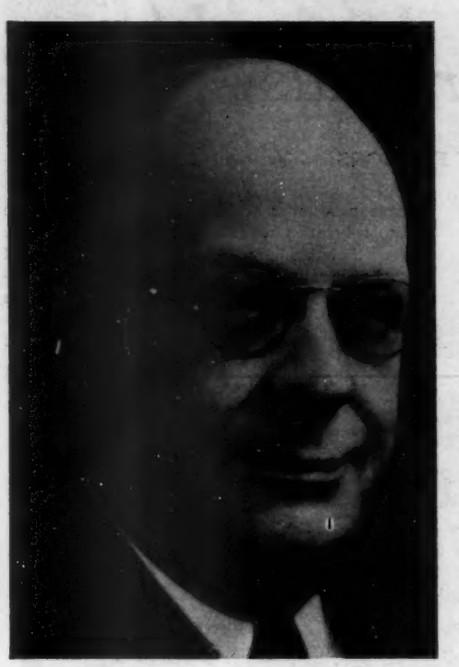
In some places, particularly along the Nemaha ridge fold, there was a tendency toward en echelon arrangement of secondary anticlines. The areas in which igneous intrusions occurred in Pennsylvanian or later time are shown to have been already slightly domed by pre-Pennsylvanian folding. An ill-defined area in Republic and adjoining counties appears to have no Mississippian rocks. The absence of Mississippian rocks in this area may indicate only a local pre-Mississippian topographic high. It may, on the other hand, indicate a folding that trends northwest, parallel to the Central Kansas uplift.

As the structural features are closely related to the thinning of the Mississippian rocks, there is a close relation between thinning and the occurrence of oil and gas on the anticlines in the central and eastern parts of the state. Nearly all fields that produce from anticlines are underlain by thin sections of Mississippian rocks. It is concluded, therefore, that the presence of a thin section of the Mississippian in areas thus far unproductive may in some cases indicate the proximity of incompletely explored structural highs and warrant further investigation of the local conditions. Some prominent anticlines, however, are not productive of oil or gas.

The producing zones in Mississippian rocks appear to be independent of the stratigraphic formations. Production is dependent on the porosity of the limestone. The base leveling of the folded rocks brought the various formations of the Mississippian to the surface at different places and subjected them to weathering and leaching. In some places where the ground-water level had been lowered, porous zones are present to a depth of over 100 ft. below the surface of the Mississippian.

A full discussion of the relation of the thickness of the Mississippian limestones in central and eastern Kansas to oil and gas deposits is given in Bulletin 26 of the State Geological Survey of Kansas prepared under a cooperative agreement between the state and federal geological surveys.

ANDREW F. SCHOEPPEL
Chairman of Kansas Corporation Commission



T. A. MORGAN
Director of conservation, Kansas Corporation Commission

Kansas Conservation

By T. A. MORGAN
Director of Conservation, Kansas Corporation Commission

THE preservation of the petroleum resources of the State of Kansas through the mechanism commonly known as proration has been of material benefit to the oil operators of the Sunflower State. This program also has to its credit the stabilization of an industry sorely in need of new methods to conserve and enjoy an ever-increasing supply of oil.

In 1929 the producers in the Valley Center pool of Sedgwick County, and shortly thereafter in the Greenwich pool, the Ritz-Canton and Voshell pools of McPherson County, voluntarily adopted a plan by which they restricted the rate of production from their wells. The practical benefits resulting from restricted production were recognized by the legislature which proceeded in the year 1931 to enact legislation designed to assure the benefits of production control to the state as a whole. However, effective regulations to carry out the proration policy were not inaugurated until September 8, 1933.

By that year the bringing in of additional pools greatly increased the daily productive capacity of the state which necessitated certain changes in the law.

Value of Proration

Proration has fostered the orderly development of one of the state's most important resources during a period which included not only the depression of 1929 but the discovery of such prolific sources of supply as the East Texas field. Out of the flood of oil that was experienced at the end of the '20's arose the conditions which led to successive reductions in the price of this basic raw commodity until in many areas crude oil was selling for as little as 10 cents per barrel. Proration reversed this trend and in its place established restricted rates of production which have been shown to prevent physical waste and at the same time balance supply with demand, with the consequent economic stability and a fair price—both to the producers and to the public.

It would be most apt to describe the regulations adopted by the State of Kansas as a policy by which the production of crude petroleum is limited to the current demand and the resulting allowable thereafter allocated among the pools and wells in such a manner as to do justice and equity to the correlative rights of all concerned. There may be instances in which inequities have arisen but no scheme of regulation can be perfect. It is most important to realize that the program as a whole has for the most part accomplished ratable taking and conservation without undue discrimination between producers.

The producers of the state have become aware of the fact that important benefits are to be gained by stabilizing the industry through the means of proration. Uniform development on wider-spacing patterns, decreased operating costs and increased ultimate recovery, both in barrels and dollars, all tend to permit the operator to carry on as a part of the American system of free enterprise.

The commission's continual struggle with the problems arising out of proration has led to a better understanding between the operators and the administrators of the law. The improved technique of oil production at restricted rates has eliminated the old conditions which caused many fields to be abandoned long before their recoverable oil was produced. Through the knowledge gained by the operators under proration, they would no longer countenance the production of oil from their wells beyond the optimum rate even though the proration laws were to be repealed. In administering proration, the conservation office recognizes that what is good for the oil industry is good for the state—that the problem is a mutual one. Cooperation rather than antagonism is the result.

The Future of Kansas

Kansas at this time offers the greatest inducement to successful production operations of any of the oil-producing states by virtue of its proven but yet undeveloped areas. Western Kansas, where the horizons vary from 2,500 to 6,500 ft., has just been scratched so far as production development is concerned.

Due to its geographical location, Kansas is favorably situated as an oil-producing state to serve the markets of the Mid-Continent area. At the present time Illinois is its chief competitor. Illinois is unregulated and if it continues production in

(Continued on Page 117)

ARNOLD R. JONES
Kansas Corporation Commission

SAMUEL E. BARTLETT
Kansas Corporation Commission

J. F. JONES
Assistant general counsel

JOHN P. ROBERTS
Assistant conservation director

HAROLD MEDILL
General counsel

Kansas Wells Benefited by Slower Withdrawals

By HARRY F. SIMONS

FORCED economies often provide unexpected benefits and the recent production history of Kansas has shown that the rigid proration has not only revised operating practices to a great extent but also may have increased the reserves substantially. Faced with a declining market for the past 3 years and a steady diminution of the daily average production, operators in the area have had to rely on a reduction in operating expense to keep their businesses profitable. Practically all of the producing practices in the area are dictated by that necessity, including reduction in size of casing, tubing, surface equipment, acidizing costs, oil treatment and water disposal, and the prevention of corrosion and unnecessary water encroachment.

The most successful treatment for fighting water encroachment is the one enforced by a lack of market which has caused a reduction in the amount of oil produced daily; aiding this cause has been the introduction of the productivity index (drawdown or sonic) method of taking potentials. For years some of the operators have contended that much of the water trouble in the Arbuckle lime, the principal producing horizon in the area, was caused directly by the manner of equipping and producing the wells, which was in turn due to the manner of taking potentials. To get a large potential and a large allowable, a well had to be equipped with a maximum-size equipment, 3-in. tubing, 2¾-in. working barrel, 1-in. or ⅞-in. sucker rods, and a 50-hp. pumping unit or rig front. Operation of this equipment was expensive and economy dictated that it be run as few hours per day as possible.

This size equipment could produce the well's allowable in less than an hour and even when restricting the length of the stroke and the number of strokes per minute, the rate of production was too fast and water began coming into the wells, the Arbuckle having generally a high vertical permeability.

Since the method of taking potentials was changed, the necessity of large pumping equipment has been eliminated and it has been found that the wells equipped with small units and operated over a longer period per day have had less water trouble.

Not only has this method been successful in halting encroachment of the water but it has actually reduced the amount of water and increased the amount of oil produced from a well. This is one of the brightest spots in the Kansas production picture at the present time.

The effect on the reserves of the various fields is obvious, the reduction in the amount of water produced increasing their life. Another very important factor is the knowledge gained of producing formations through the taking of the productivity index potentials as this information provides a guide to the proper rates of producing the wells. Operators have increased the values of their properties by restricting production or changing their methods to accord with the rate the oil is coming into the hole as shown by the productivity index.

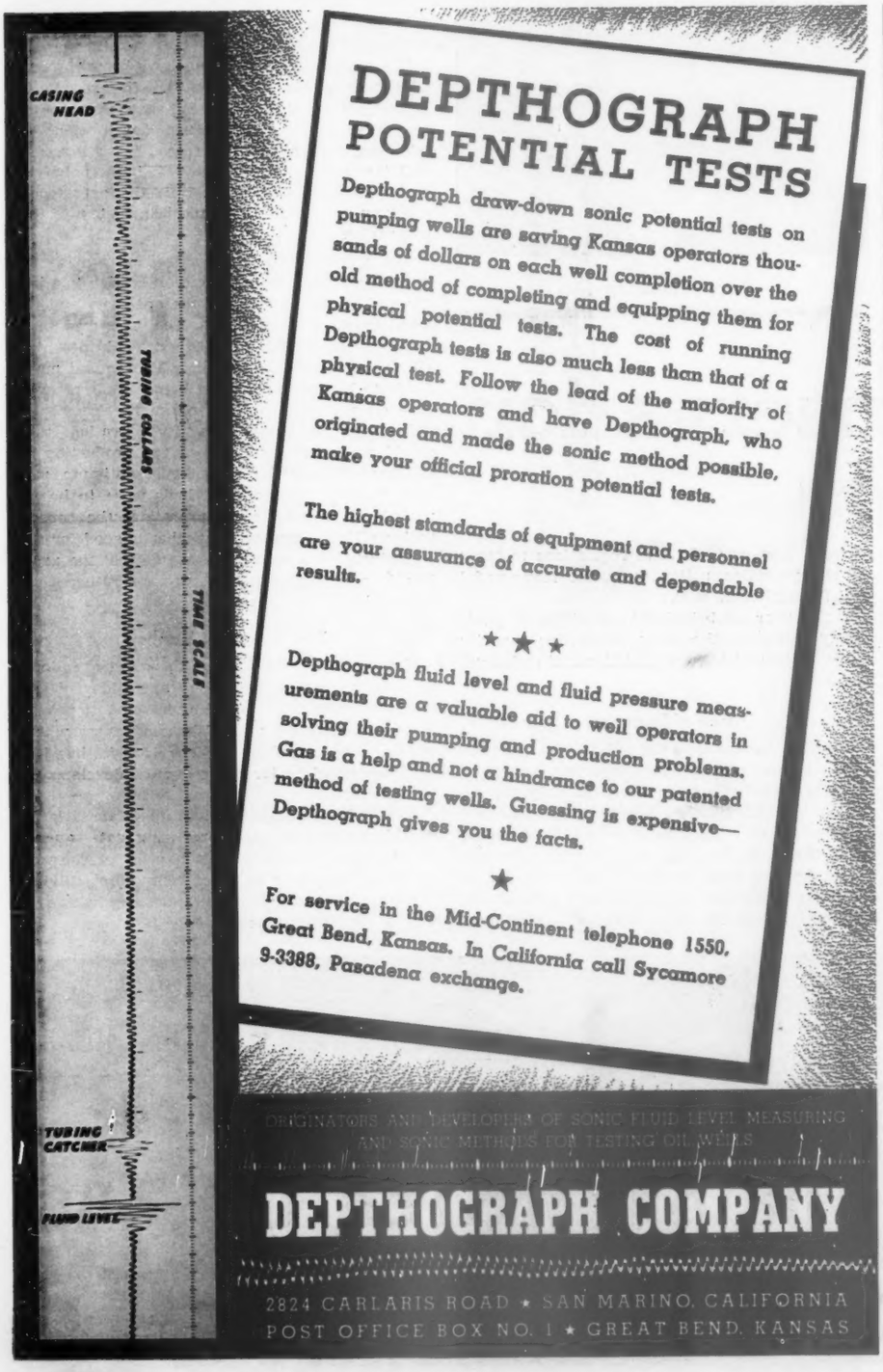
Producing Zones

Forty-three of the prorated fields in Kansas are producing from more than one horizon with 27 producing from two formations, 11 from three formations and five from four formations. The two formations most commonly found productive in an area are the Arbuckle limestone and the Kansas City-Lansing lime horizon, these two formations being the source of the bulk of Kansas production. Prorated fields include 106 Arbuckle pools, 70 Kansas City-Lansing pools, 21 Mississippi chat pools, 14 Viola lime pools, 10 Topeka lime pools, 9 Gorham sand pools, 7 Wilcox pools, 5 Simpson pools, 5 basal conglomerate pools, 3 Reagan sand pools, 2 Hunton pools, 2 pre-Cambrian pools, 2 Misener sand pools, 1 Tarkio pool and 1 Dodge pool.

The average depth of the Arbuckle limestone producing horizon is 3,624 ft. while the average depth of the Kansas City-Lansing is 3,240 ft. Following is a table of counties in which these two formations are outstanding.

County—	Arbuckle Fields	Arbuckle Av. depth	K.C.-Lansing Fields	K.C.-Lansing Av. depth
Barton	30	3,377	10	3,194
Ellis	12	3,481	8	3,330
Ellsworth	8	3,281	2	2,990
Reno	1	3,775	2	3,537
Rice	16	3,249	7	3,022
Russell	22	3,248	24	3,047
Stafford	13	3,700	5	3,550

While producing depths vary from 2,300 ft. to 4,600 ft., the bulk of production is from a depth of approximately 3,500 ft. This has led to uni-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formity of equipment in the Kansas fields as far as the depth capacity is concerned. However, Kansas operators have not standardized on any particular method as the reservoirs have different peculiarities and consequently must be treated differently. Almost all of the production in the state is lifted by some artificial means, flowing fields being rare. The most prominent flowing field at the time is the Bornholdt pool in McPherson County.

Completion

Wells are drilled by the rotary method to the top of the pay where casing is set and cemented and the well then completed with cable tools. This practice is followed even in the fields which have flowing completions, the Kansas operators having a dislike for rotary mud in the producing formation. The trend has been definitely to small casing, 4½-in. and 5½-in. being the most common-size pay string. Care is taken not to set the pipe so low as to case off part of the pay zone.

In some instances the producing formations are continuous while in others the pay may be distributed in streaks over a considerable vertical distance. This is another reason for the cable-tool completions as this method allows greater control and makes it easier to determine whether the well is being harmed or helped by continued drilling.

Acidizing

The use of acid in Kansas wells is almost standard practice although the recent tendency has been to use minimum amounts as overacidization may cause water troubles. In practically all fields it has been discovered that much of the water trouble can be eliminated by watching closely the pressure necessary to move the acid into the formation. Some operators have a specified pressure for each field which must not be exceeded in acidizing a well; as long as this pressure is not exceeded, the wells are not damaged but a few pounds in excess of the specified pressure may result in future water difficulties.

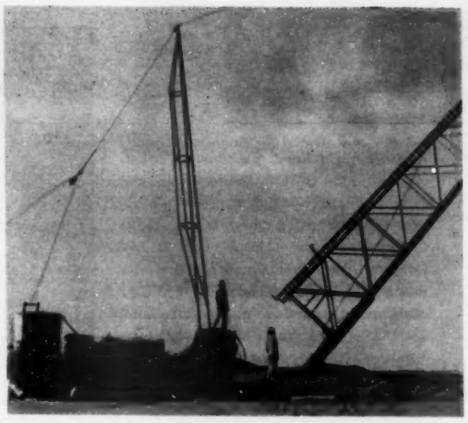
As the potential obtained at completion determines the allowable of the well, operators try to get the maximum potential of 3,000 bbl. Arbuckle wells are tested before completion and where the well will make that much naturally, the acid treatment may be eliminated and the well completed following a state-supervised test. If a preliminary pumping or swabbing test does not indicate the well will make a maximum potential, it is acidized and then tested again. A well may receive four or five acid treatments before it is considered ready for the state test. In determining whether the well will make the maximum potential, a single reading is taken with a fluid-level measurement device while the well is being pumped or swabbed.

The Arbuckle lime wells are helped by the acid but are not entirely dependent on the acid treatment for the high initial production and hence small amounts of acid are used in the endeavor to prevent water encroachment. Cores of the Arbuckle lime taken from the well are often tested to determine the proper amount of acid to use, but so far no general rule has been developed, the policy being to apply the acid in stages of 300 to 500 gal. until the desired effect is obtained. If the well is low structurally, restraint is used in applying the acid. The Arbuckle pay zone varies from 3 to 20 ft. in thickness and averages about 8 ft.; it sometimes is in two separate sections with varying permeability.

The Kansas City-Lansing lime has as high as three separate pay sections which vary in thickness from 3 to 12 ft. The total of the pay sections averages 12 ft. The size of the initial production on a Kansas City-Lansing lime well is proportional to the acid treatment up to 8,000 gal.

In treating both the Arbuckle and Kansas City-Lansing pay sections the acid jet gun is used to

(Continued on Page 116)



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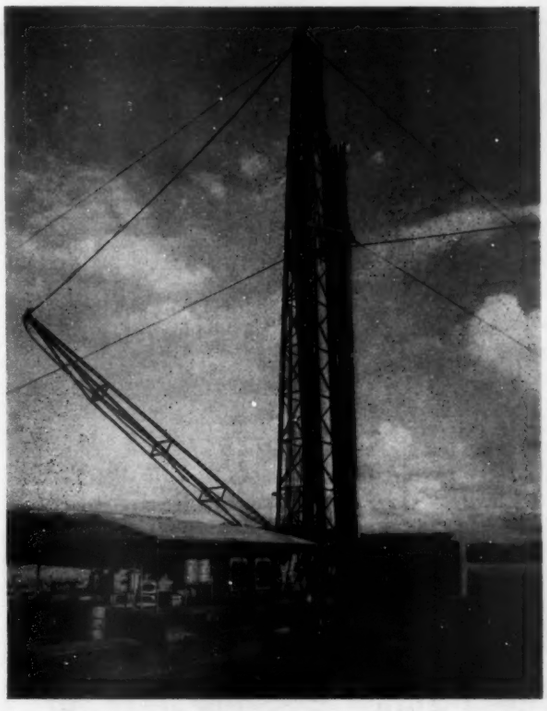

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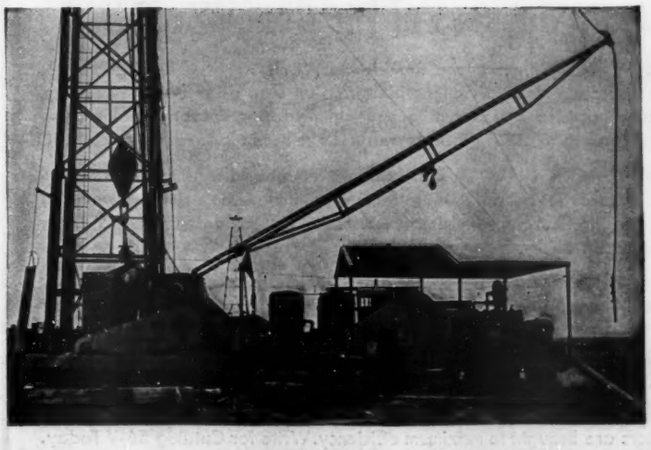

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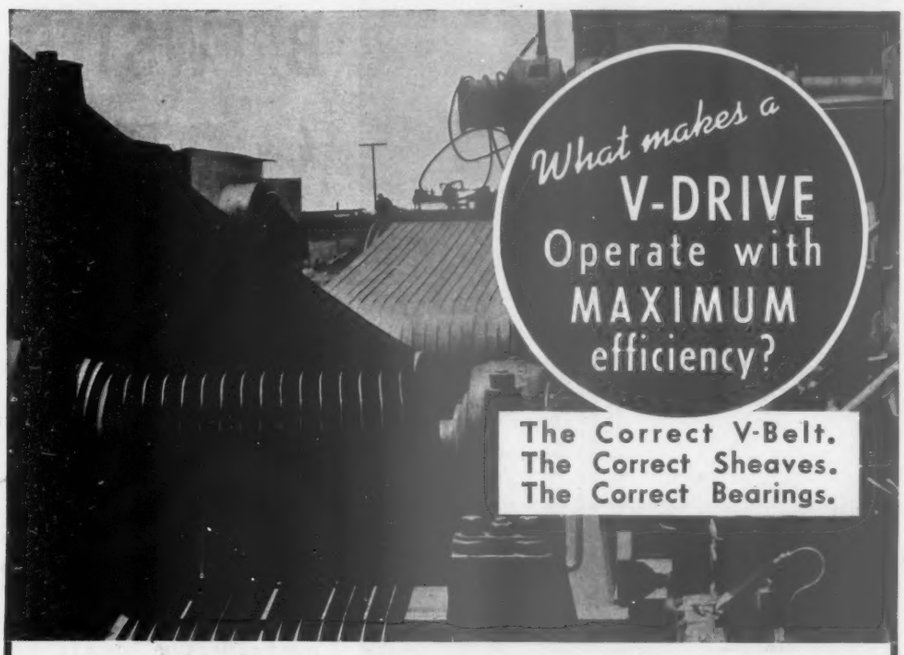

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MEDART

Kansas Wells Benefited by Slower Withdrawals

(Continued from Page 115)

great advantage. In Arbuckle completions a retractable jet gun is run inside the tubing and the well bore enlarged by pumping 15 per cent inhibited acid against the walls of the hole while the casing is left open. The gun is then removed from the hole and an insert working barrel and rods run into the well and a pumping test made. Swabbing is often substituted for the pumping. This treatment is particularly effective on wells where the formation is tight and production small (2 bbl. per hour). It is followed by a regular acid treatment in which the casing is kept closed and the acid forced into the formation by pressure from the acid pumps.

In recent months there has been a tendency to drill through the Kansas City-Lansing section to the Arbuckle and then plug back and remove the casing if the lower formation is found to be dry or after it has been exhausted. In such completions the face of the formation is cleaned by jetting with the acid jet gun. A regular acid treatment can then be applied.

Where there are several zones in the Kansas City-Lansing, the jet gun is used for selective acidizing of the pay sections. In this method the openings in the gun are placed opposite the pay streak and the casing is kept closed around the tubing, the permeability of the formation being great enough to obtain the desired velocity of acid against the formation. The acid is thus directed in the desired portions of the formation. In some cases this type well is acidized by using a packer or sealing material to protect the unproductive zones.

Pumping

Nearly all of the wells in the state are completed as pumping wells although there are some exceptions. However, in many of the pools, the fluid level is quite high and this affects the type of pumping equipment used and the length of tubing and rod strings.

If a physical potential test is to be taken on the well, it will be equipped with a 2¼-in. working barrel located opposite the face of the producing formation. If productivity index potentials are to be taken, the tubing will be located just far enough below the static level to permit obtaining the expected daily production or to obtain a satisfactory allowable from the test. Tubing and rod strings of 1,500 ft. are not uncommon in wells 3,500 ft. deep. Eventually all wells so equipped will have to be equipped with strings of tubing and rods to the bottom.

New wells are being equipped mostly with 2⅛-in. EUE tubing and ¾-in. rods, although some

operators are using 2-in. EUE tubing and ⅝-in. rods. This is a sharp contrast to the 3-in. EUE tubing and ⅞ and 1-in. rods with which wells were being equipped a short time ago. Working barrels are proportionately smaller and are generally of the liner or insert type. In some wells operators are using casing pumps successfully without any apparent wear on the rods or casing. The principal saving is in the elimination of a tubing string. In such installations a small working barrel, 1½ to 2-in., is used.

The older wells which are now taking the productivity-index potentials are generally retaining their old rods and tubing and will probably continue to do so until they are ready to be discarded. The rod strings are theoretically large enough to be used on very deep wells and it would appear at first glance as if it would be more economical to transfer the rods to wells in deeper areas. However, these rods were severely abused in the taking of physical potential tests and they probably would have a high percentage of failures if the load on them were increased.

For years Kansas operators have used pumping units or rig fronts for surface equipment, very few central-geared or bandwheel powers being in evidence in the western part of the state. In the older areas the powers are quite common. Much of the country occupied by the oil fields is also farming or grazing country and the rod lines about the lease would be a hazard and a nuisance to the landowner. In addition, the pumping units are more flexible and no balancing other than at the well is required.

Beam pumping is not the only method used for lifting oil as electrically driven centrifugal pumps and fluid-driven reciprocating pumps located in or near the bottom of the hole are used, particularly where large volumes of fluid must be handled. Current for the electrical centrifugal pump is in some cases generated on the lease. There are also some wells equipped with these pumps which are producing only small quantities of water and in such cases the pumping elements are located just far enough below the fluid level in the hole to insure satisfactory performance.

Kansas Conservation

(Continued from Page 113)

the future as it has in the past, its life as an oil-producing state will be of short duration. If, on the other hand, Illinois adopts proration so that production is curtailed to market demand to prevent waste, it will not be able to continue to supply the market in the future that it has supplied in recent months. This all indicates that the future outlook for the oil producers of Kansas is bright. Already in 1940, approximately 235 miles of main pipe lines have been completed while many other purchasing companies are planning pipe-line extensions.

Eastern Kansas

With its 14,000 wells, producing approximately 43,000 bbl. daily, eastern Kansas is still an interesting study after 50 years of production. An intense interest in secondary recovery is encountered in many of these older pools and waterflooding and gas-repressuring projects are being pressed forward at a rapid rate. Approximately 50 per cent of the recoverable oil remains to be recovered in the stripper area.

With its recoverable reserves approaching 1 billion barrels, the second largest industry in the state looks forward to many years of profitable operations. The economic welfare of the state is so interwoven with the oil industry that its citizens will enjoy the innumerable benefits derived from it in the future.

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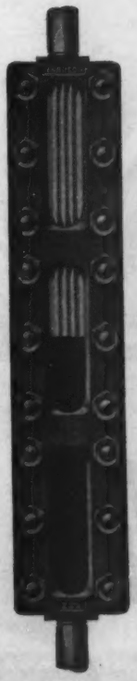

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One-Fourth of Kansas' Area Leased for Exploration

LEASING of land for oil and gas was reported in many Kansas counties in the first quarter of 1940, with some large blocks being assembled and numerous checkerboard spreads being taken by major companies and independent operators. This activity continued with increasing momentum as midyear approached and, although numerous long-term leases were due to expire this year and some were not expected to be renewed, indications were the losses would be more than offset by new leases on other tracts.

Accurate figures on acreage taken this year cannot be ascertained yet, as many leases have not been filed for record. It has been estimated that in the first 4 months major companies had leased blocks totaling about 100,000 acres. In addition, they leased many small, checkerboard tracts and independent operators had assembled numerous small blocks and spreads. Most of the 1940 leases have been for 5 years, with some 10-year leases and some for short terms.

Counties on, or bordering, the Central Kansas uplift, where a majority of the state's more active pools are located, have been favored by lease buyers. Some blocks have been assembled or are in process of being leased in Ellis, Ellsworth, McPherson, Rice, Rooks, Russell and Stafford counties, on or near the uplift. Barton County, largely leased in blocks by major companies, has had some checkerboarding. Gulf Oil Corp. has been active in Ellis and Russell counties, both closely leased. Phillips Petroleum Co. has some core-drilled blocks in Ellsworth County, and other major companies active in leasing in the counties named include Cities Service, Continental, Indian Territory, Skelly, Stanolind and others, as well as small companies and individuals.

Cowley County is another favored area, perhaps having more lease activity than any district off the uplift. Discovery and development of several prolific pools in this county, which has had a considerable revival of activity in the past 2 or 3 years, has accounted for much of the new leasing. Among other operators, Sinclair Prairie Oil Co. has been leasing in Cowley and its neighbor on the west, Sumner County. Barber is another southern Kansas County in which some blocks have been leased this year. It is a closely leased county and lack of pipe-line outlets has retarded development, but recent activity in the Whelan and Medicine Lodge areas has spurred leasing of open acreage.

Buying Is Widespread

Southwestern Kansas has had some activity, with Stanolind Oil & Gas Co. one of the bigger buyers. Routine leasing has been reported in far western and northwestern counties. The Kansas sector of the Forest City basin, in the northeastern part of the state, had its big lease boom in 1938-39, but considerable buying is continuing with the discovery of oil in Richardson County, Nebraska, adjoining Brown and Nemaha counties on the north, and the more recent discovery of oil in Jefferson County accounting for some of this activity. Leasing also is reported in Johnson County, where there have been some recent oil and gas strikes, and in Douglas County, where a new wildcat has been started on a considerable block. Some minor deals have been reported in the old southeastern oil and gas counties.

Numerous farm-out deals have been made in the Central Kansas uplift and Salina basin areas, with big lease owners letting some of their acreage to independent operators who agree to drill. Major companies evidence a growing willingness to contribute acreage and dry-hole money to wildcat tests. In some areas, however, proposed farm-out deals have found no takers.

There is no great leasing boom under way in the state, but steady, consistent leasing probably will continue throughout the year, with acreage close to proven fields and trends proving more popular than rank wildcat areas.

Kansas had a big lease boom in 1928-30, when many thousands of acres of long-term leases were taken in western Kansas. There was a decline in subsequent years, but a revival came in 1937, when oil firms again became aggressive in their search for reserves. This resulted in a new peak for acreage leased, with estimates ranging from 12,500,000 acres to 14,000,000 acres, or about one-fourth of the state, under lease by the end of that year.

The bulk of the 1937 buying centered in the Central Kansas uplift counties, with the west flank of the Dodge City basin in southwestern Kansas accounting for much of the remainder. There also was some leasing in extreme western counties and the Salina basin, in the north-central part of the state. At the end of 1937, land was under lease for oil and gas development in 99 of the state's 105 counties. Rentals paid for leases that year totaled approximately $11,500,000.

Stafford County led the state at the end of the year, with 95 per cent under lease. Barton, Ellis

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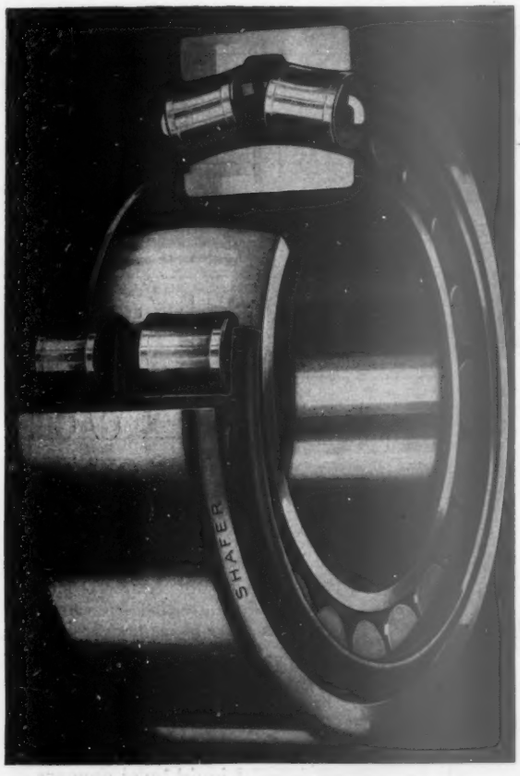

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and Pratt counties were next, 90 per cent leased. Counties with as much as 70 per cent under lease included Barber, Graham, Grant, Reno, Rice, Rooks and Stevens. Major companies participating in the 1937 play took blocks or checkerboard spreads in 39 central and western counties.

In 1938, leasing continued the active trend of the previous year, despite a decline in operations as a result of development in Illinois. Most active areas at the beginning of the year were in Graham, Rooks and Sheridan counties, with outstanding activity in several northeastern counties by some major companies. The land under lease in proven oil areas showed little change, but extensive plays developed in wildcat districts.

The accompanying table shows approximate amount of acreage leased in the more active central and western counties by major operators in 1938 and 1939. It is estimated nearly 1,000,000 acres additional were taken in the 2 years by small companies and individuals, plus the leasing in the Forest City basin.

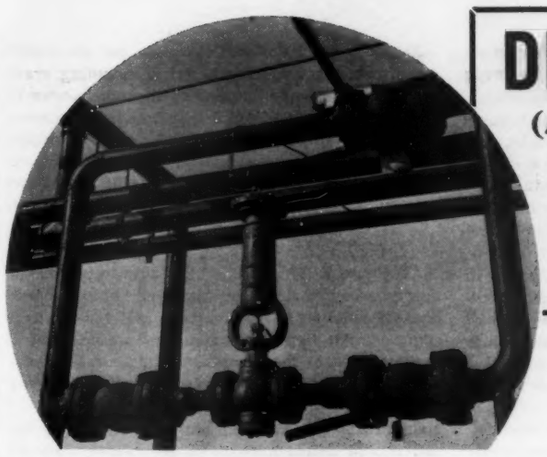
County—	1938	1939	Total
Barber	7,750	14,250	22,000
Barton	.....	7,410	[2]7,410
Cloud	42,650	[2]16,750	59,400
Comanche	9,850	.....	9,850
Cowley	11,000	34,300	45,300
Decatur	30,800	1,200	32,000
Edwards	1,150	8,500	9,650
Ellis	[4]4,820	10,550	15,370
Ellsworth	.....	[5]8,750	8,750
Finney	[6]20,500	3,780	24,280
Ford	5,730	.....	5,730
Graham	72,320	11,500	[6]83,820
Grant	3,950	[7]12,950	16,900
Gray	5,540	1,700	7,240
Greeley	1,420	1,000	2,420
Gove	20,950	.....	20,950
Hamilton	18,500	.....	18,500
Harper	2,750	.....	2,750
Hodgeman	5,750	[8]11,840	17,590
Jewell	3,450	.....	3,450
Kearny	.....	17,500	17,500
Kingman	.....	17,550	17,550
Kiowa	[9]19,580	800	20,380
Lincoln	[10]29,170	7,650	36,820
Logan	8,400	.....	8,400
Marion	.....	1,000	1,000
McPherson	.....	[11]8,800	8,800
Mitchell	19,200	34,100	53,300
Norton	[12]33,830	.....	33,830
Ottawa	24,350	6,840	31,190
Pawnee	.....	12,950	12,950
Phillips	10,000	1,280	11,280
Pratt	4,400	9,750	14,150
Reno	3,000	.....	3,000
Republic	[13]42,130	.....	42,130
Rice	.....	6,980	6,980
Rooks	26,850	13,500	40,350
Rush	.....	1,350	1,350
Russell	.....	640	640
Saline	.....	[14]5,250	5,250
Scott	[15]5,650	1,450	7,100
Sedgwick	.....	[16]4,090	4,090
Sheridan	[17]85,740	500	86,240
Stafford	950	6,800	7,750
Stevens	7,360	17,100	24,460
Sumner	900	2,150	3,050
Thomas	24,750	.....	24,750
Trego	.....	3,600	3,600
Wallace	53,650	640	54,290
Wichita	19,150	.....	19,150
Total	687,940	326,750	1,014,690

[1]Partly in Rush and Russell counties.
[2]Partly in Clay County.
[3]Partly in Rush County.
[4]Partly in Russell County.
[5]Partly in Haskell County.
[6]Partly in Norton, Rocks and Sheridan counties.
[7]Partly in Finney, Haskell and Kearny counties.
[8]Partly in Ness and Pawnee counties.
[9]Partly in Ford County.
[10]Partly in Mitchell County.
[11]Partly in Rice County.
[12]Partly in Phillips County.
[13]Partly in Jewell County.
[14]Partly in Dickinson County.
[15]Partly in Wichita County.
[16]Partly in Butler County.
[17]Partly in Decatur and Thomas counties.

Salina Basin Activity

One of the outstanding developments of 1938 was the leasing by Carter Oil Co. of 21 blocks in the Salina basin, an almost wholly wildcat territory. Most of it was taken as a result of seismograph exploration. Gulf and Ohio also took single blocks in this basin. The west flank of the Nemaha granite ridge, a geological feature of eastern Kansas, shared largely in the 1938 buying with about 250,000 acres taken. The bulk of this was assigned to Tide Water Associated Oil Co. Stanolind found the Dodge City basin in western Kansas attractive, while most other big buyers confined much of their activity to the Central Kansas uplift and neighboring districts.

By the end of the year the now famous Forest



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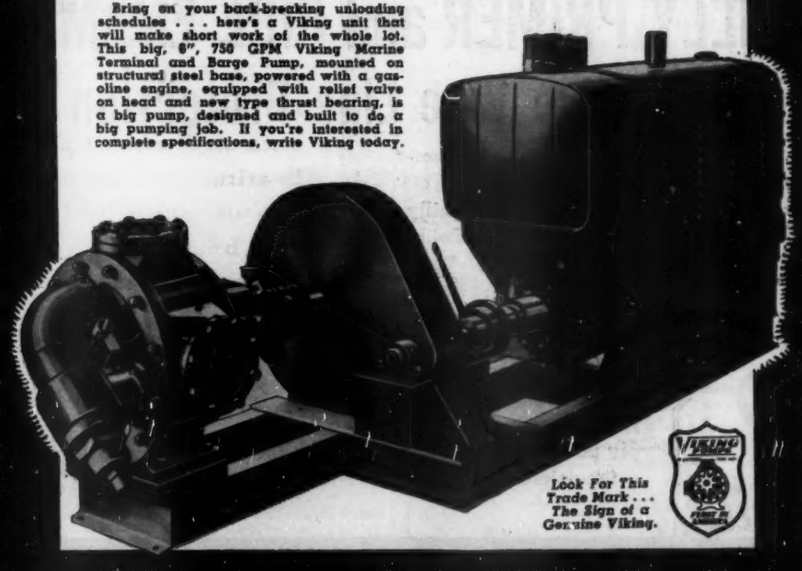

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City basin lease boom was under way, northeastern Kansas counties sharing with neighboring sectors of Missouri, Iowa and Nebraska.

High cost of rentals and several wildcat failures resulted in the surrendering of many blocks, particularly on the south and west flanks of the Central Kansas uplift. Some tracts scheduled for release were retained when rentals were reduced, especially in outlying districts where $1 an acre annual rentals had prevailed.

This dropping of acreage continued early in 1939, numerous tracts being released after companies had thoroughly checked and found them unpromising. Leasing in other areas more than offset culling of undesirable wildcat tracts, and by the end of the year total acreage under lease approximated that of 1938.

The Forest City basin buying spree subsided before the year ended, but not until an estimated 1,000,000 acres had been taken in the northeastern Kansas sector. This activity, including areas beyond the accepted limits of the basin, was in Atchison, Brown, Doniphan, Douglas, Jackson, Jefferson, Johnson, Leavenworth, Nemaha, Osage, Pottawatomie, Shawnee, Wabaunsee and Wyandotte counties. Considerable acreage has since been released, but many large blocks still are held.

Widespread Leasing

At the end of 1939 leasing was reported in nearly every part of the state, with buying less pronounced in the southeastern and far western counties. An important discovery would start a buying spree in the counties on or near the Colorado border, as that part of the state is believed to hold considerable promise.

Operators participating in the Kansas lease activity, in addition to those mentioned, include the Amerada, Arkansas Natural Gas, Atlantic, Ambassador, Barnsdall, Burke-Greis, Barbara, Babcock, Champlin, Crown, Carlay, California, Central, Coralena, Columbian Fuel, Deep Rock, Derby, Elbar, Ewers-Simpson, Glimac, George Oil, Helmerich & Payne, Kessler, Lario, Magnolia, Midland, Mid-Plains, Margay, Mitchell Drilling, Mission, Mutual, Mid-Continent, National, Northern Natural, Olson, Ohio Oil, Ohio Fuel Supply, O. K. Supply, Power, Pawnee Royalty, Panhandle Eastern, Pacific Western, Republic Natural, Sagamore, Sunray, Sun, Shell, Texas, Transwestern, Tulsa Oil, Union, Vickers, Vernon, Western Kansas and Westgate-Greenland companies. In addition, there are many individuals holding Kansas leases.

Drilling a slim-hole test in the Burnett area, Ellis County, one of the more closely leased counties in Kansas. From 80 to 90 per cent of the county is under lease

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Steady Expansion in All Phases Of Kansas Operations

(Continued from Page 30)

and gasoline stocks are lower than those of the nation as a whole. A considerable amount of the crude in storage is not Kansas oil, but is oil in transit from Texas and Oklahoma fields to the east. Refining and crude stocks have become stabilized, and in this phase of the industry Kansas is in as good or better position than other oil states.

Several New Pools

Several news pools have been opened this year, and numerous extensions have been made and new producing horizons uncovered in proven fields. The first oil has been found in the Kansas sector of the Forest City basin and, although the discovery well in Jefferson County is a small producer, it is encouraging to those operators who have shown their faith in the basin by leasing around 1,000,000 acres in northeastern Kansas. Countless locations in the new pools and older proven areas remain to be drilled and, with an increased market in prospect, it appears likely that many of these will be drilled this year and next.

The 1940 discoveries include the North Bornholdt pool in McPherson County; Snider-Simpson pool, Section 9-21-11w, Stafford County; Hall-Arbuckle pool, Section 23-14-13w, Russell County; Ernsting-Arbuckle pool, Section 1-20-12w, Barton County; Rahn-Bartlesville pool, Section 13-34-5e, Cowley County; South Ellinwood-Arbuckle pool, Section 6-20-11w, Barton County; Krier-Arbuckle pool, Section 31-16-11w, Barton County; Ehler-

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Arbuckle pool, Section 35-16-10w, Ellsworth County; Wondra-Lansing pool, Section 15-17-12w, Barton County; Gurney-Basal pool, Section 25-14-14w, Russell County; Krier-Lansing pool, Section 30-16-11w, Barton County; Hoffman-Arbuckle pool, Section 18-16-11w, Barton County; Hall-Howard lime pool, Section 28-14-13w, Russell County; Bitikofer-Chat pool, Section 1-20-1w, McPherson County. Discovery wells are near completion in Section 4-10-20, Jefferson County, and Section 15-34-3e, Cowley County. In addition to these, numerous extensions have been made or new plays found in the Stoltenberg, Hall-Gurney, Trapp, Silica, Bornholdt, Burnett, Bemis, Zenith, and other pools.

The great bulk of drilling activity this year has been and will continue to be confined to McPherson, Rice, Ellsworth, Stafford, Barton, Russell, and Ellis counties, on or near the Central Kansas uplift, and to Cowley, Butler, and Greenwood counties in the eastern district.

As development is extended farther northwest along the uplift, counties in which production already has been found, such as Rooks, Trego, Graham, and Phillips, may be expected to become very active.

Conservative Exploration Program

In the south, Pratt, Kingman, and Barber counties continue to be explored conservatively but may develop drilling campaigns of some intensity if, when and as the market demand justifies. A conservative drilling program is being carried out in the Cunningham-Cairo gas field of Kingman and Pratt counties and, with the area getting a new outlet soon, more activity may be anticipated. The Whelan pool in Barber County was extended a few weeks ago, and some new work is under way there.

Virgin areas yet to be explored intensively include northeastern Kansas, the Salina basin in the north central part of the state, the extreme northwestern counties and the widespreading southwestern Kansas district. Barring the discovery of a major field, only northeastern Kansas seems likely to have much increase in activity within the next year. The northeastern counties may anticipate considerable drilling, in view of developments in the Forest City basin. At this writing, it seems that early activity in the Salina basin and northwestern counties may be confined to an occasional wildcat.

Southwestern Kansas is the big question mark. There, in the Dodge City basin, the north extension of the Anadarko basin of Oklahoma, along the Hamilton dome, in the big Hugoton gas field or elsewhere in the southwestern district, some geologists and oil men believe the future great fields of Kansas will be found.

While still a rank wildcat country, some oil has been found in the area generally considered as southwestern Kansas. These discoveries include the Aldrich pool in Ness County, the Morrison pool in Clark County, the Shallow Water pool in Scott County, and the Nunn pool in Finney County.

There in southwestern Kansas is one of the world's greatest gas fields, the Hugoton field which spreads over some seven Kansas counties and one Oklahoma County and which is yet to be defined.

Discovery of oil beneath the Hugoton gas field is predicted. As Dr. K. K. Landes, assistant state geologist, points out, oil eventually has been found in the vicinity of every large gas field with but few exceptions, and these eventually may be removed. The Texas Panhandle gas field, with which the Hugoton field some day may be connected, is an example. Some years after its discovery, oil was found beneath a part of the great area underlain by the more mobile gas. Examples in Kansas include the Otis field in Rush and Barton counties, the Medicine Lodge field in Barber County, the Lyons field in Rice County, and the Cunningham field.

Dodge City Basin

Further discoveries may be expected in the Dodge City basin, which lies southwest of the Central Kansas uplift. Several fields already have been found on the flanks of the basin, including three pools in Barber County, the Morrison pool in Clark County, and the Cunningham field. Oil and gas working up the sides of this structural basin become trapped in local domes. Undoubtedly, other fields remain to be discovered in that area.

Surely the neighboring Shallow Water and Nunn pools, the one in southern Scott County and the other but a few miles distant in northwestern Finney County, are not the only productive spots in that extensive district. An important wildcat is being drilled in Kearny County, about 25 miles west of the Nunn pool, at Stanolind Oil & Gas Co.'s No. 1 Judd, Section 15-21-38w. Should it find important production, this area may have an early increase in exploration. If it fails, it will be but one hole in a vast territory and more wildcat tests will follow.

Several factors have delayed exploration in the southwest, an extensive district wherein only a few tests have been drilled. The isolated geographical location, far from the great consuming markets, is a prime deterrent. Another is the fact that here the oil sands lie deeper than elsewhere in the state, and development will be much more costly. Many Kansas operators look upon the southwestern district as a future happy hunting ground for oil, but until conditions justify they are going to remain nearer the Central Kansas uplift and other areas where oil can be found at shallower depth and nearer the markets.

Some day, though, some daring wildcatter may find the major pool that geologists believe is existent in southwestern Kansas. That may be this year, next year, or many years in the future. Whenever the discovery is made, another upsurge in Kansas activity will follow.

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For a more complete discussion of the above instruments and methods: See Tab C., page 43, Producing Equipment Directory, or write for descriptive literature.

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The northwestern extremity of the Gurney area extends to within about 4 miles of the town of Russell, county seat of Russell County, West Central Kansas.

Principal towns

The town of Russell has a population of approximately 4,480. Hoisington, about 20 miles south of the field, has a population of 3,723, and Great Bend, 11 miles south of Hoisington, has a population of 8,660. Smaller, nearby towns include Bunker Hill and Dorrance.

Highways and roads

Hard-surface highways traverse the county north and south, east and west. County roads connecting with these highways penetrate the field.

Railroads serving the area

The Union Pacific passes through the town of Russell and traverses the county, east to west, with convenient sidings and loading points. A branch of the Santa Fe runs across northern Barton County, a few miles south of the field.

Cities and towns where supply houses have branches

Supply houses are numerous throughout this part of Kansas, with major distribution points at Russell, Great Bend, Hoisington, Chase, Ellinwood, and other towns.

Hotels and accommodations

Modern hotel accommodations are available at the larger of the nearby towns, within easy driving distance of the field.

Power and gas

Small multiple-cylinder gas engines are used in the field. Some gas is produced on leases.

DEVELOPMENT

The Hall pool was opened at J. J. Hall and Russell Oil Corp.'s No. 1 Miller, SW SE SE Section 30-14-13w, May 12, 1931. It had Lansing-Kansas City lime pays at 2,902-4 ft. and 2,985-3,085 ft., total depth 3,111 ft. The Gurney pool was discovered at Hartman & Blair's No. 1 Gurney, SE SE NW Section 24-14-14w, February 15, 1935. It had Lansing pay at 2,932-3,006 ft., total depth. As development in the two areas proceeded, production was uncovered in Howard (or Tarkio) lime, Topeka lime, Gorham sand, Arbuckle lime, Reagan sand, and granite wash. Some production from pre-Cambrian granite was found in the Hall area. The Allon, South Gurney, and Michel pools ultimately were joined with Gurney, and the Letsch, South Letsch, Southwest Letsch, and Berrick pools have been consolidated with Hall. Subsequent drilling has shown the Greater Gurney and Greater Hall pools to be one large field, with production in 10 sections in Township 14s-14w, in 1 section in Township 15s-14w, in 14 sections in Township 14s-13w, and in 1 section in Township 15s-13w.

Many inside locations remain to be drilled in both sectors of the field, and in the intervening space between Hall and Gurney.

Active operations

There were 26 active operations as of June 15, including locations, rigs, drilling wells, and wells being completed.

Lease ownership

Leases are well divided between major and independent operators, including the Argo, Central, Cities Service, Continental, Coralena, Crown, Darby, Elbar, Eldorado Refining, Gulf, I.T.I.O., Magnolia, Margay, Mid-Continent, National, Ohio, Phil-Han, Phillips, Saco, Shell, Signal, Simpson, Sinclair Prairie, Skelly, Stanolind, Texas, Texon, Vernon, and Yuma companies, and M. Billings, J. R. Donley, J. J. Hall, Hartman & Blair, Helmerich & Payne, Inc., D. S. Landon, I. Nadel, Charles Newbold, G. J. Ruff, C. W. Shaffer, Jones & Shelburne, R. H. Shields, G. A. Stearns, W. I. Southern, Inc., and C. H. Trapp.

Producing wells

The Corporation Commission listed 232 producing wells in the Hall-Gurney pool in the June 1940 proration report.

Operator—	No. wells	Potential	April runs
Aylward Production Co.	7	19,533	5,436
A. Billings	7	12,410	7,421
Braden & McClure	1	2,222	1,430
Central Petroleum Co.	2	3,326	1,432
Cities Service Oil Co.	20	18,514	10,791
Continental Oil Co.	4	5,471	2,525
Coralena Oil Co.	7	7,347	4,602
Darby Petroleum Co.	4	5,878	2,409
J. J. Hall	22	10,175	11,296
Hartman & Blair	7	6,998	5,483
Helmerich & Payne, Inc.	4	8,158	2,724
Landon-Stoppel-Boxberger	3	4,946	2,167
Magnolia Petroleum Co.	2	3,058	1,199
Mid-Continent Petroleum Corp.	10	13,675	4,848
Murfin-Parks	1	15	414
National Refining Co.	1	2,111	515
Russell Production Co.	1	15	427
Saco Oil Co.	7	3,556	3,130
R. H. Shields	16	24,503	12,270
Sinclair Prairie Oil Co.	6	6,442	4,971
Skelly Oil Co.	26	22,084	13,104
Smoky Hill Oil Co.	1	15	462
W. I. Southern, Inc.	1	171	483
Stanolind Oil & Gas Co.	25	36,192	13,865
Stearns Drilling Co.	7	20,288	7,723
Texas Co.	9	7,216	4,257
Texon Oil Co.	23	37,267	18,770
Yankey & Stearns	8	4,679	4,005
Total	232	286,265	148,159

GEOLOGICAL INFORMATION

Gurney was discovered on an anticline found by subsurface geology. South Gurney was on an anticline found on trend. Hall was on an anticline found by core drill, as was Letsch. The field is a result of a cross-folding condition, causing a regional high with the Arbuckle horizon cut out over most of the proven area. It is on an east-west fold, with some cross folding. Location is on the Central Kansas uplift, generally trending from southeast to northwest across the northern part of West Central Kansas. Lansing-Kansas City lime runs fairly consistent throughout the field. Although cut out on the high, Arbuckle lime is found on the east side. A new producing zone, called Howard lime by some and Tarkio lime by others, recently was uncovered in the Hall area, offsetting two Lansing producers which failed to find oil in the Howard zone. Other producing horizons include Topeka, Gorham, Reagan, and granite wash zones. Three different horizons in the Lansing-Kansas City zone have been proven productive, at about 15, 30, and 90 ft. in the zone.

DRILLING CONDITIONS

Derricks

Rotary derricks generally are used, including mostly conventional types, with some portable rigs. Some cable rigs also are used. Some operators use 122-ft. steel derricks, with 25-ft. base and no substructure. Others use 81-ft. and 84-ft. derricks, with 20-ft. bases. Some of the conventional rigs are used for slim-hole drilling, as well as the portable rigs.

Types of drilling equipment

A wide variety of drilling equipment is used, depending upon individual preferences of the many operators. Some use 3½-in., some 4½-in. drill pipe; 7¼ by 14-in. mud pumps generally are in use; some rigs are equipped with 250-hp. 2-cylinder oil engines, many have multiple-cylinder engines of various makes, using butane, natural gas, gasoline of diesel power. Traveling blocks and rotary tables are of various sizes.

Speed and cost of drilling

From 20 to 25 days generally are required to rig up and complete a well pumping. Ten to twelve days' drilling time usually is required to drill to top of Lansing lime. Complete cost of a well on the pump will run around $18,000. Contract prices vary. Some operators use their own tools.

Casing program

From 200 to 250 ft. of surface pipe is used, generally 10¾-in. If the well is drilled for Lansing production, some operators set 4½-in., some 7-in. pipe on top of the lime. Some operators drilling to that zone condition hole so it can be deepened to other horizons later. At least one company favors a 5½-in. oil string.

Type of bits used

Tricone bits generally are used, averaging from seven to nine to a well.

Completion methods

It is the rule to drill to top of the formation with rotary, set pipe, and drill in with cable tools. Some holes are drilled to the deep pays, pipe set on bottom, and casing perforated in Lansing or other formation where oil is sought. A few flowing wells were completed, but the great majority are completed on the pump.

Acid treatment

While a few wells have been completed naturally the general practice is to acidize, usually with 1,000 to 3,000 gal., although in some instances greater amounts have been used. Hall-Gurney wells rarely are shot.

PRODUCTION PRACTICES

Method of producing oil

All wells are on the pump, although a few flowed initially. Common working barrels and various plunger-type pumps are used, sizes and makes varying with the operators.

Tankage

Some 210-bbl. welded tanks, some 500-bbl. bolted tanks are in place. A few 1,000-bbl. steel tanks have been installed. No separators have been used as yet.

Water conditions

The strictly prorated quantity of oil taken from the wells has retarded water encroachment. Accordingly, water has not yet come into the Arbuckle wells, although that horizon in Kansas usually carries water. There has been no trouble to speak of with water in the Lansing-Kansas City horizon, although water is present in the lower part of that formation.

GENERAL DATA

Spacing

Originally, Hall-Gurney wells were drilled on 10-acre tracts. It now is the general practice to drill on 20-acre spacing.

Pipe-line outlets

The Kaw Pipe Line Co. serves the field.

Crude-oil analysis

An analysis of oil from the Oswald, or Lansing-Kansas City lime, horizon in the Hall pool, as made by the U. S. Bureau of Mines:

Sample 36019—Oswald limestone (Kansas City-Lansing)—2,950 ft.

General Characteristics

Specific gravity, 0.823 — A.P.I. gravity, 40.4
Sulfur, per cent, 0.37 — Color, brownish black
Saybolt Universal viscosity at 77° F., 43 sec.; at 100° F., 41 sec.

Distillation, Bureau of Mines, Hempel Method

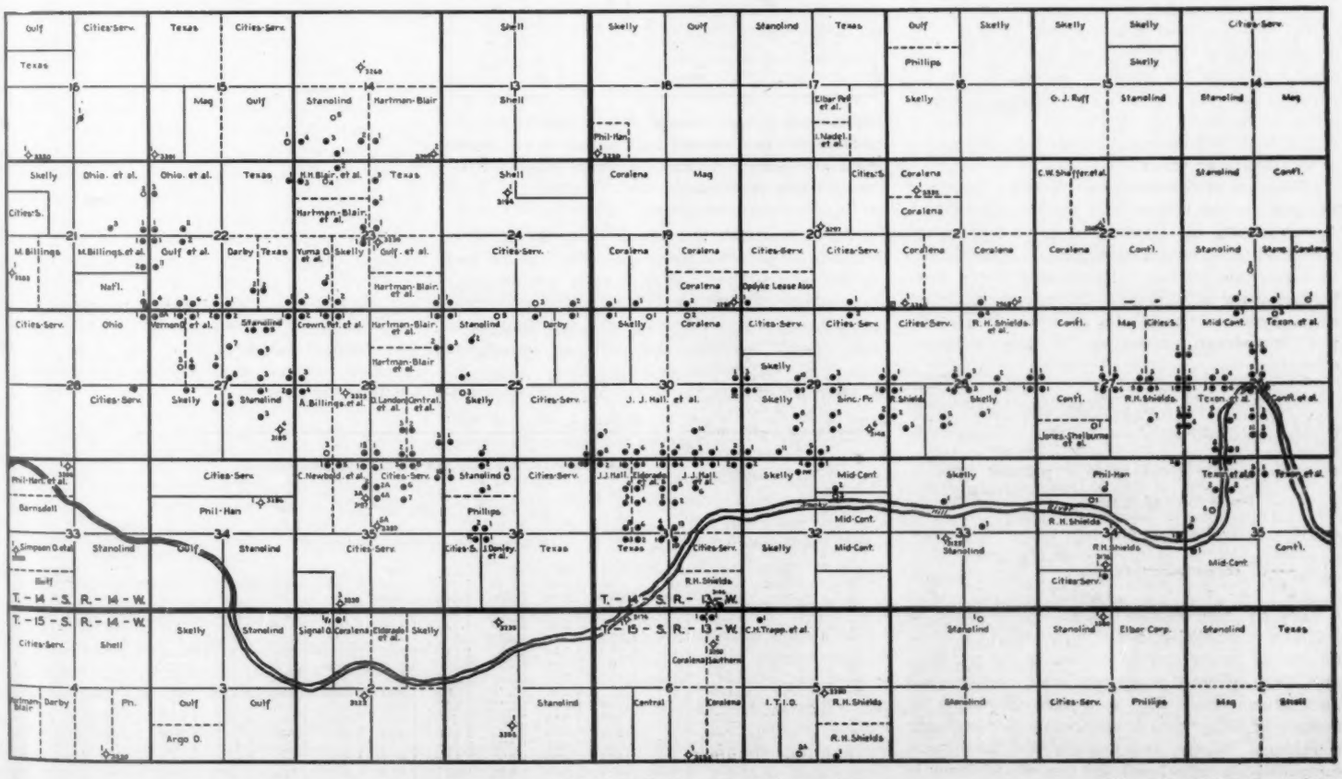
Distillation at atmospheric pressure, 748 mm. First drop 30° C. (86° F.)

Fraction No.	Cut at °C.	Cut at °F.	Per cent	Sum per cent	Sp. gr. 60/60° F.	°A.P.I. 60° F.	S.U. visc. 100° F.	Cloud test °F.
1	50	122					...	...
2	75	167	7.5	7.5	0.639	89.9	...	...
3	100	212	5.1	12.6	.691	73.3	...	...
4	125	257	7.0	19.6	.720	65.0	...	...
5	150	302	5.9	25.5	.740	59.7	...	...
6	175	347	5.2	30.7	.758	55.2	...	...
7	200	392	4.9	35.6	.775	51.1	...	...
8	225	437	4.9	40.5	.791	47.4	...	...
9	250	482	5.5	46.0	.805	44.3	...	...
10	275	527	5.9	51.9	.819	41.3	...	...
Distillation continued at 40 mm.								
11	200	392	6.8	58.7	0.845	36.0	43	20
12	225	437	5.1	63.8	.859	33.2	53	35
13	250	482	3.7	67.5	.872	30.8	73	50
14	275	527	3.9	71.4	.884	28.6	110	70
15	300	572	8.7	80.1	.895	26.6	210	90
Residuum	...	...	17.0	97.1	.976	13.5	...	...

Carbon residue of residuum 16.7 per cent; carbon residue of crude, 2.8 per cent.

Approximate Summary

	Per cent	Sp. gr.	°A.P.I.	Viscosity
Light gasoline	12.6	0.660	82.9	.....
Total gasoline and naphtha	35.6	0.715	66.4	.....
Kerosene distillate	16.3	.806	44.1	.....
Gas oil	7.6	.846	35.8	.....
Nonviscous lubricating distillate	9.0	.855-.881	34.0-29.1	50-100
Medium lubricating distillate	6.6	.881-.893	29.1-27.0	100-200
Viscous lubricating distillate	5.0	.893-.902	27.0-25.4	Above 200
Residuum	17.0	.976	13.5	.....
Distillation loss	2.9	.....	.....	.....



Hall-Gurney field, Russell County, West Central Kansas — Midcontinent Map Co., Wichita

Suggested Field Practices—No. 2 . . .

Proper Selection of Prime Mover Leads to Pumping Economy

By T. P. SANDERS

IT is sometimes assumed that the prime mover chosen for a pumping well should correspond in horsepower rating to the nominal horsepower rating of the pumping unit. This assumption may lead to poor selection, since a 20-hp. unit may be used customarily on wells requiring anywhere from 7 to 25 hp. output from the prime mover. The size prime mover needed should be determined directly from the horsepower required at the polished rod, allowing a suitable factor for overall efficiency of the pumping unit.

Whenever possible, the load to be handled should be measured with a dynamometer, but since no measurement is possible on a new installation until equipment is installed, the expected load must be calculated. It should be remembered, however, that pumping history of all pools in the Mid-Continent shows, without exception, an increase in average polished-rod load with aging of the field. Receding fluid levels, reduction of gas production, and encroachment of water all lead toward greater pumping loads. Safe practice therefore calls for installing a prime mover with sufficient power to pump fluid the weight of water from the total depth of the well at the desired rate with no assistance offered by fluid level.

A major producing company has completed a study of dynamometer cards that has enabled them to predict the power required for a new pumping installation. A formula was devised to define the enclosed area of the typical dynamometer card. It is recalled that this enclosed area represents the work or horsepower at the polished rod. The formula is therefore a representation of horsepower, determined not upon theoretical basis but upon data from a large number of dynamometer cards.

Inspection of dynamometer cards for speeds of 10 s.p.m. or less reveals that the enclosed area is approximately the product of peak load minus dead load times length of stroke. At speeds above 10 s.p.m. this relation fails because of the force necessary for acceleration. In order to approach actual dynamometer results, an acceleration factor was introduced, resulting in the following formula:

$$\text{Hp. (at polished rod)} = \frac{W_t \times S \times S.p.m. \left(1 + \frac{b^2 s}{g}\right)}{396{,}000}$$

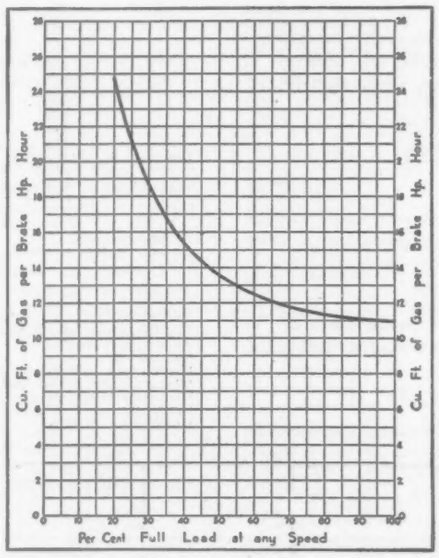
W_t = static fluid load = plunger area × feet of lift × hydrosatic pressure per foot of fluid
S = length of stroke in inches
$S.p.m.$ = strokes per minute
$1 + \frac{b^2 s}{g}$ = acceleration factor

Since the above formula predicts the work required at the polished rod, it is necessary to allow for loss of power due to friction in the pumping unit. Data collected from tests on 30 average field installations show that a surface-equipment efficiency of 85 per cent is apparent under ordinary conditions. Where heavy units are used with comparatively light loads, the loss of efficiency is greater, becoming as much as 60 per cent in some cases. Within this range a suitable figure for efficiency must be chosen. One company prefers to use a figure of 85 per cent for efficiency of all surface pumping installations, contending that if the surface equipment consumes much more than 15 per cent of the power delivered by the engine, corrective steps should be taken, rather than providing more power.

If the hole is known to be crooked, an extra allowance can be made at this point to take care of subsurface friction. As a rule, the formula above is not intended for crooked wells, as the load cannot be predicted and such wells will probably always defy mathematical analysis. News wells are nearly always drilled straight, and they therefore permit the use of engineering procedures which often proved futile in the past.

After determining the power required for pumping, it is necessary to select a prime mover that will handle the calculated load economically. If a gas engine is employed, it must be loaded to a point approaching full-load capacity for good economy. The effect of partial loading on fuel economy is shown in the accompanying graph.

If the engine is underloaded, fuel enocomy and initial investment both suffer, but if it is loaded too severely, early repairs will result. For four-cycle gas engines, the maximum conditions consistent with continuous operation seem to be 1,000 ft. per minute piston speed and 50 to 75 lb. per sq. in b.m.e.p. For two-cycle engines the maximum recommended piston speed is 800 ft. per minute, and the maximum b.m.e.p. is 45 lb. per sq. in. In the Producing Equipment Directory, Page G-14 are tables giving the horsepower rating per cylinder. An allowance of about 10 per cent should be made for engine accessories.



Representative fuel consumption in relation to load for multicylinder gas engines fully equipped with accessories and using 1,100 B.t.u. gas (after James McNiell, The Oil and Gas Journal, Nov. 18, 1938)

Electric Motors

For good power economy it is necessary to have the motor loaded somewhere between one-half and full load. Between these points the efficiency does not vary more than 3 per cent. Below one-half the decline becomes more rapid. If a high-slip, continuous-rated, squirrel-cage induction motor is used, sufficient power will be available so long as the name-plate horsepower rating is equal to or greater than the calculated horsepower requirement. If a high-torque normal starting-current motor is selected, multiply the required horsepower by 1.33. The name-plate horsepower should conform to this corrected value.

●

Pumping Costs Greatly Reduced In Bemis Field

Before adoption of proration in Kansas, lowest operating cost was secured by installing pumping equipment to handle all the oil a well was capable of producing. The first proration orders, calling for physical potentials on each well, still made large equipment necessary. When the Kansas commission approved the "drawdown method" of taking potentials early in 1939, Cities Service Oil Co. made a study to determine the size pumping units needed in the Bemis field under the new conditions. As a result, a novel change was made.

At three wells where 50-hp. gas engines had been installed to drive 40-hp. pumping units it was found that the engine houses were large enough to accommodate 35-kw. generators. The engines were therefore left in place but connected to the generators, while the 40-hp. pumping units were replaced by 10-hp. motor-driven units. Pumping units and engines at other wells were equipped in this same manner. The net result is that three engines that were formerly used to take potentials on three wells are now used to generate electric power for pumping 26 wells.

ACCELERATION FACTORS FOR PUMPING WELLS

Calculated values for $1 + \frac{b^2 s}{g}$

Polished-rod strokes—in inches

S.p.m.	18	22	24	26	30	32	34	42	44	54	64	74	120	132
10	1.026	1.031	1.034	1.037	1.043	1.045	1.048	1.060	1.063	1.077	1.091	1.105	1.171	1.188
12	1.037	1.045	1.049	1.053	1.061	1.066	1.070	1.086	1.090	1.111	1.131	1.152	1.246	1.270
14	1.050	1.061	1.067	1.072	1.084	1.089	1.095	1.117	1.123	1.151	1.178	1.206	1.335	1.368
16	1.066	1.080	1.087	1.095	1.109	1.117	1.124	1.153	1.160	1.197	1.233	1.269	1.437	1.481
18	1.083	1.101	1.110	1.120	1.138	1.147	1.157	1.194	1.203	1.249	1.295	1.341	1.553	1.608
20	1.102	1.125	1.136	1.148	1.171	1.182	1.193	1.239	1.250	1.307	1.364	1.421	1.683	1.751
22	1.124	1.151	1.165	1.179	1.207	1.220	1.234	1.289	1.303	1.372	1.441	1.509	1.826	1.909
24	1.147	1.180	1.197	1.213	1.246	1.262	1.279	1.344	1.361	1.442	1.524	1.606	1.983	2.082
26	1.173	1.211	1.231	1.250	1.288	1.308	1.327	1.404	1.423	1.519	1.615	1.712	2.154	2.269
28	1.201	1.245	1.268	1.290	1.335	1.357	1.379	1.468	1.491	1.602	1.714	1.825	2.338	2.472
30	1.230	1.282	1.307	1.333	1.384	1.410	1.435	1.538	1.563	1.691	1.819	1.947	2.536	2.690
32	1.262	1.320	1.350	1.379	1.437	1.466	1.495	1.612	1.641	1.787	1.932	2.078	2.748	2.923
34	1.296	1.362	1.395	1.428	1.493	1.526	1.559	1.691	1.724	1.888	2.052	2.217	2.973	3.171
36	1.332	1.406	1.442	1.479	1.553	1.590	1.627	1.774	1.811	1.996	2.180	2.364	3.212	3.433
38	1.370	1.452	1.493	1.534	1.616	1.657	1.698	1.863	1.904	2.109	2.315	2.520	3.465	3.711
40	1.410	1.501	1.546	1.592	1.688	1.728	1.774	1.956	2.100	2.229	2.457	2.684	3.731	4.004

QUESTIONS ON TECHNOLOGY

By W. L. NELSON, TECHNICAL EDITOR

W. L. NELSON

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to W. L. Nelson, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists, and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible. Inquiries must be signed but only the given initials will be printed. The source of the question is considered to be confidential.

Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.

Correction of Boiling Point For Atmospheric Pressure

There has been some argument as to the applicability of the Sydrey-Young equation for barometric pressure corrections. Would this formula hold true for the boiling points of ethyl mercaptan?—N.A.C.

Barometric pressure correction equations such as

$$C = 0.00012\ (760 - P)\ (273 + t_c)$$

in which

P = observed barometric pressure
t_c = observed boiling point, °C.
C = correction to boiling point, °C.

are applicable to all organic compounds except those that are associated. However, the accuracy is greater with some materials than with others. In as much as ethyl mercaptan is not associated to any extent, the above equation should apply within an accuracy of about 0.1°.

In reality, boiling-point corrections are nothing more than the relation of temperature to vapor pressure. For this reason, equations of the form given above can be obtained with ease if vapor-pressure data are available. The only change in the equation will be in the numerical constant. The International Critical Tables gives the following equation for the vapor pressure of ethyl mercaptan through the range of 8 to 45° C.

$$\log_{10} p^{mm} = 7.672 - \frac{0.05223 \times 28{,}210}{T}$$

in which

p^{mm} = vapor pressure in millimeters
T = absolute temperature, °K.

According to these data the constant of the Sydrey-Young equation ranges from about 0.000096 to 0.000114 rather than being constant at 0.00012.

Propane Versus Crude Oil As Boiler Fuel

I would like a little information on the relative cost and efficiencies when using an average 35° A.P.I. crude oil or propane for firing drilling boilers.—C.W.M.

The efficiency of firing is not greatly different for propane than for crude oil except that the propane flame and burner can be more accurately controlled because of the high pressure under which propane is held and because being a gas at atmospheric pressure, an intimate mixture with air can be maintained without the use of atomizing steam.

The heating values of the propane and an average crude oil are about as follows:

Propane	21,590 B.t.u./lb.	92,800 B.t.u./gal.
Crude oil (35° A.P.I.)	18,000 B.t.u./lb.	127,000 B.t.u./gal.

In this respect, the crude has a great advantage over the propane, but of these amounts of heat, only a part can be utilized. The propane can be fired with a smaller amount of excess air so that less heat is lost through the stack—and steam must be used to atomize the crude oil with the result that the steam carries some heat up the stack. These last factors are variable ones which depend upon the efficiency of firing and upon the amount of steam required for atomizing the crude oil and hence only an approximate comparison can be made. It appears that about 1.25 gal. of propane will generate the same amount of useful heat as 1 gal. of crude oil. On such a basis, the price of propane would have to be about 2.5 cents per gallon to compare with crude oil at $1.35 per barrel. No account is taken of the cost of providing new equipment for storing and firing propane.

Reclaiming Crankcase Oil

There is nothing in our library here at school on the subject of reclaiming and rerefining of crankcase-oil drainings. I write to you to see if you can throw a little light on the subject or suggest where I might get this material. I have heard that rerefined oil is better in many respects than the original oil.—W.B.C. Jr.

A number of references are listed below. The major interest in oil reclaiming occurred between 1925 and 1930, and may have since waned because of the low prices of neutral oils and bright stocks (6 to 14 cents per gallon at refineries) that can be obtained by large consumers.

The arguments both pro and con which are presented in discussions of the merits of reclaimed oil can usually be explained by a consideration of the method of refinement. If the crankcase oil is refined by a series of operations which is as complete and as carefully controlled as the original process of making lubricating oils out of crude oil, the reclaimed oil will be equal to regular oils. However, if some of the operations of distillation, treating, or filtration are not used in the reclaiming process, the reclaimed oils may be inferior. In many instances reclaimed oils are giving good service.

The late Dr. Charles K. Francis discussed reclaimed oils on the Technical Questions page as follows: December 29, 1927; July 12, 1928; December 27, 1928; January 3, 1929; February 13, 1930; February 27, 1930; March 27, 1930; January 22, 1931; April 30, 1931; July 2, 1931; May 26, 1932; November 23, 1933; January 9, 1936; May 7, 1936; May 28, 1936; August 11, 1938; and December 21, 1939.

Wax Distillate Content Of Crude Oils

Please show the products separated by the distillation of Bradford (area) Pennsylvania crude oil with particular reference to the wax-distillate content? Suggest also several crude oils from Texas, Oklahoma, Kansas, and California which compare with the Pennsylvania crude oil in wax-distillate content?—A. G. W. B.

The yield of wax distillate is not a constant quantity from a crude oil because some refiners can successfully dewax very heavy or high-viscosity wax distillate whereas others are not equipped to do so. The yield also depends upon the kind of cylinder stock that is being produced. For this reason the yields given herein are merely relative ones for comparative purposes. The wax distillate considered here is one having a viscosity of 80 seconds S.U. at 100° F. although many wax distillates running as low as 65 viscosity have been processed and occasionally ones as viscous as 120 may be processed. The type of cylinder stock contemplated is one having a viscosity of 160 at 210° F.

Yields from a typical Bradford area crude oil are approximately as follows:

	Per cent
Loss	1.0
Raw gasoline (400 end point)	35.0
Raw kerosene (45 A.P.I.)	17.0
Gas oil	10.0
Wax distillate (80 viscosity)	20.0
Cylinder stock (160 viscosity)	17.0

Approximate wax-distillate contents of some other crude oils are:

	Per cent
Coyote, California	16.8
Playa Del Rey, California	14.0
Ranger, Texas	16.0
Big Lake, Texas	16.0
Oklahoma City, Oklahoma	21.0
Tonkawa-Marshall, Oklahoma	16.4
Boynton, Oklahoma	24.5

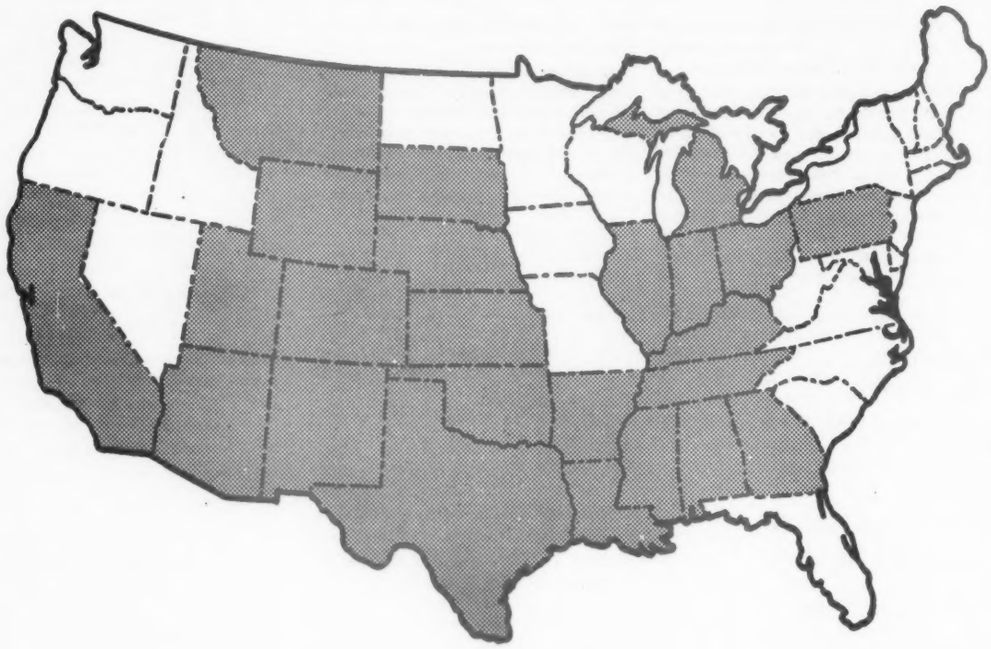
These figures should not be taken too literally, for you can doubtless find a big variation in oils from the same field and in the manner of processing.

If wax-distillate content is of primary importance, you may be able to select crude oils of low A.P.I. gravity and thus get larger than normal yields of lubricating-oil stocks For example, the wax-distillate content of Bradford crudes averages about as follows:

	Per cent
40 A.P.I. and lower	22.0
43 A.P.I.	20.7
45 A.P.I.	19.4
47 A.P.I. and higher	18.6

Some of the very low gravity Pennsylvania crude oils (36 A.P.I. and lower) contain more than 27 per cent wax distillate.

EXPERIENCED IN 24 STATES



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FIELD OPERATIONS

Summarizing the Week's Developments

ILLINOIS—Average daily production in the state passed the 500,000-bbl. mark last week. The Centralia field alone increased 24,220 bbl. per day in production. W. C. McBride, Inc., completed the largest well yet recorded in Illinois on its lease in Section 35-2n-1w, in the Centralia area. It flowed 3,732 bbl. in 6 hours.

TEXAS: Gulf Coast—Wildcats in Brazoria and Matagorda counties were scheduled for production tests and an offshore Chambers County outpost was showing encouragingly.

Southwest Texas—The Stratton gas and distillate field in Nueces County was definitely proven as an oil region. A new sand in the White Point field yields gas and distillate. A well in Laguna Madre Bay shows promise of opening a pool.

West Texas—Prospects brightened for the opening of oil fields in Crockett, Winkler, and Andrews counties where wildcats have been indicating commercial production for several weeks.

West Central Texas—An extension of 1 mile southeast for the Loving field in Stephens County and a 1½-mile northwest extension for the Fagg field in the same county were features.

North Texas—Indicating one of the largest fields yet discovered in the recently launched Fort Worth basin play throughout northern Texas, the Seay field (Omohundro area), Montague County, is being given a 3-mile northeast extension.

East Texas—Three wildcats were started in eastern Texas. Rusk County was given a deep 7,500-ft. lower Trinity wildcat; a 4,800-ft. Woodbine sand wildcat was located in Cherokee County, and Red River County received a shallow test north of Clarksville.

KANSAS—An oil discovery well was completed in Jefferson County, Forest City basin, and new wildcats were started in Jefferson, Douglas and Nemaha counties in the basin. A pool opener was completed in Section 30-13-16w, southwest of the Emmeram pool, Ellis County.

NEBRASKA—The third well in the Falls City pool flowed 744 bbl. daily after an acid treatment, to rate as the state's biggest producer. It extends the pool to within 2¾ miles of the Kansas line. Work was starting at two Nebraska tests and a third was due to start soon.

OKLAHOMA—A wildcat on the east edge of Guthrie, Logan County, found showings of oil in Simpson zone and was checking high structurally. Exploration of lower Arbuckle lime pay zones was started at Oklahoma City.

LA-ARK-TEX—A shallow oil field was opened in Acadia Parish in coastal Louisiana. The Cockfield sand proved productive in the Eola field in Avoyelles Parish. Shell Oil Co., Inc., started important wildcats in Sabine Parish, North Louisiana, and in Bowie County, Texas.

Completions in All Fields

(Week Ended June 22, 1940)

	Oil	Gas	Dry	Total	1940 total comp. to date	1939 total comp. to date
N. Y., Pa., and W. Va.	62	7	5	74	1,869	1,471
Ohio	9	10	11	30	513	449
Indiana	3	1	9	13	173	106
Kentucky	2	1	0	3	226	296
Illinois	74	0	15	89	1,724	1,639
Michigan	16	1	7	24	619	619
Kansas	40	5	14	59	796	561
Oklahoma	22	0	13	35	881	879
Texas:						
North Central Texas	39	0	17	56	1,523	1,136
West Texas	37	0	2	39	1,067	893
Texas Panhandle	7	0	0	7	285	182
East Texas	4	0	0	4	132	248
East Central Texas	2	1	2	5	127	125
East Texas Border	2	0	2	4	34	34
Gulf Coast Texas	20	2	2	24	635	657
Southwest Texas	28	1	18	47	1,106	1,137
Total Texas	139	4	43	186	4,909	4,412
North Louisiana	9	2	2	13	292	252
Gulf Coast Louisiana	12	0	6	18	446	275
Total Louisiana	21	2	8	31	738	527
Arkansas	2	0	4	6	101	119
Montana	4	1	4	9	87	66
Wyoming	4	0	1	5	70	45
Colorado	1	0	0	1	9	4
New Mexico	10	0	2	12	328	289
California	13	0	3	16	522	446
Total United States	422	32	139	593	13,565	11,928
Total previous week	472	52	121	645		
Week ended June 24, 1939	350	32	103	485		

Outstanding Fields—Highlights

(Week Ended June 22, 1940)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
K.M.A.	11	45	11	5,483	1,396	34,985
Hull-Silk	20	53	8	6,104	288	8,100
Wasson	17	49	1	1,347	852	31,865
Ector County	19	63	9	7,394	2,176	51,000
Jones County	3	21	0	0	628	8,100
East Texas	4	7	4	160	26,002	397,000
OKLAHOMA						
Oklahoma City	0	13	3	1,467	853	102,300
Cement	1	17	1	75	312	7,275
KANSAS						
Bemis	1	7	2	700	321	10,350
Burnett	2	10	2	700	99	6,000
Silica	1	9	4	1,928	635	10,550
Trapp	3	10	6	1,442	551	14,050
NEW MEXICO						
Lea County	17	43	6	2,303	2,489	90,530
Eddy County	7	56	4	947	578	16,140
LA-ARK-TEX						
Cotton Valley, La. (deep)	0	3	0	0	161	14,550
Olla, La.	2	11	1	142	14	2,085
Golden Meadow, La.	4	12	3	959	94	13,000
MICHIGAN						
Allegan County	9	29	6	1,219	494	7,251
Kent County	2	16	3	236	324	12,823
CALIFORNIA						
Montebello	0	14	0	0	346	21,775
ILLINOIS						
Salem	35	110	27	16,902	2,074	237,101
Centralia	7	65	11	35,649	716	99,670
Louden	5	24	9	1,734	1,516	73,924
Other basin fields	26	231	27	4,437	2,167	81,413
Old fields	....	.....	....	.....	.....	10,069
MISSISSIPPI						
Tinsley	1	7	0	0	66	19,563

Illinois, Indiana and Kentucky

By STAFF CORRESPONDENT

Centralia Sends Production In Illinois to 502,177 Bbl.

MATTOON, Ill., June 24.—Illinois passed the 500,000-bbl. mark in average daily crude-oil production in the week ending Saturday, June 22. The exact figure is given as 502,177 bbl. distributed as follows: Salem, 237,101 bbl.; Centralia, 99,670 bbl.; Louden, 73,924 bbl.; other basin fields, 81,413 bbl.; old fields, 10,069 bbl.

A month ago the 500,000-bbl. mark seemed improbable of attainment but the succession of big wells from Devonian lime in a restricted section of the Clinton County side of the Centralia field changed the picture.

Seventy-four oil wells were completed in the state in the past week, of which 11 were in the Centralia field with a combined production of 35,644 bbl. Twenty-seven oil wells were completed in the Salem field with a combined initial output of 16,902 bbl. The dry holes numbered 15 including 2 each in Richland, White and Williamson counties, and 1 each in Fayette, Clay, Wabash, Crawford, Bond, Clark, Wayne, Jefferson and Washington counties.

Washington County's third oil field was assured when Gulf Refining Co.'s No. 1 Buhl, 1 mile south of Irvington, in C NW SE SW Section 23-1s-1w, swabbed 214 bbl. in 12 hours from Benoist sand at 1,523-38 ft. The nearest production is in the Centralia field, 10 miles distant.

Not numbered among the week's completions in the Centralia field is a late well of W. C. McBride, Inc.'s No. 9 Carson in C E½ NE SE Section 35-2n-1w, Clinton County, a location north of a 10,800-bbl. well of the same company. No. 9 flowed 3,732 bbl. in 6 hours from Devonian lime, or at the rate of 14,928 bbl. a day.

Other late Devonian completions in the Centralia field included Gulf Refining Co.'s No. 2 Felton, in Section 1-1n-1w, which flowed 2,822 bbl. in 16 hours.; Shell Oil Co.'s No. 2-C Dunbar in Section 2-1n-1w, 3,174 bbl. in 24 hours and Adams Oil & Gas Co.'s No. 15 Copple, 6,500 bbl. in 24 hours.

Week's Completion Report

In Marion County Harvey's No. 9-B Kagy, Section 33-3n-2e, Aux Vases sand 2,023-40 ft., pumped 125 bbl. No. 10 Kagy, Section 33, McClosky lime 2,125-55 ft., pumped 120 bbl. Asher & Booth's No. 2-C McMakin, Section 34, 2,020-42 ft., pumped 80 bbl. No. 3-C McMakin, 2,020-35 ft., pumped 75 bbl.

In the Salem field the following wells were completed, the initial production, unless otherwise noted, representing 24-hour output after the wells had been shot or acidized:

Texas Co.'s completions were No. 5 Hamlin, Section 4, Aux Vases sand 2,018-63 ft., pumped 147 bbl.; No. 9 H. Sweney, Section 20, Devonian pay 3,480-3,505 ft., flowed 27 bbl.; No. 22 Friederich, Section 29, 3,515-28 ft., pumped 502 bbl.; No. 11 L. Maxwell, Section 30, 3,434-65 ft., 1,173 bbl.; No. 22 Stroup, Section 30, 3,468-3,504 ft., 1,401 bbl.; No. 15 Stroup, Section 31, 3,488-3,507 ft., 1,662 bbl.; No. 44 City of Centralia, Section 33, 3,486-3,500 ft., 628 bbl.; No. 9 Farthing, Section 33, 3,525-37 ft., 1,602 bbl.; No. 10 Farthing, Section 33, 3,494-3,520 ft., 344 bbl. in 5 hours.

In Township 1n-2e No. 9 Lankford, Section 4, McClosky at 2,080-88 ft., 147 bbl.; No. 56 City of Centralia, Section 5, 3,415-42 ft., flowed 1,784 bbl.; No. 27 Hawthorne, Section 5, 3,407-56 ft., 1,144 bbl.; No. 7 C. Reed-A, Section 5, 3,345-80 ft., 683 bbl.; No. 14 Richardson, Section 5, 3,370-95 ft., 559 bbl.; No. 16 Johnson, Section 6, Benoist and Aux Vases sands, 1,775-1,870 ft., flowed 812 bbl.; No. 15 C. Friederich, Section 7, McClosky at 2,010-20 ft., pumped 210 bbl.; No. 16 Fyke, Section 8-1n-2e, pumped 245 bbl., total depth 2,122 ft.; No. 6-B Hawkins Community, Section 8, McClosky pays at intervals, 1,956 to 2,081 ft., pumped 161 bbl.; No. 7 Fyke, Section 17-1n-2e, 2,080-2,105 ft., pumped 140 bbl.

Magnolia Petroleum Co.'s completions in Township 2n-2e were as follows: No. 53 Chitwood, Section 16, 3,492-3,512 ft., flowed 816 bbl.; No. 51 Chitwood, Section 28, 3,450-83 ft., 227 bbl.; No. 108 J. H. Young, Section 28, 3,476-3,523 ft., 768 bbl.; No. 109 Young, Section 28, 3,450-3,505 ft., flowed 520 bbl.

Ohio Oil Co.'s completions in Township 2n-2e were No. 48 Young heirs, Section 20, 3,502-15 ft., flowed 161 bbl. in 17 hours; No. 32 Lloyd, Section 28, 2,030-72 ft., pumped 10 bbl. in 6 hours and pumped off; Sheppard's No. 5 Grier, Section 30-2n-2e, 3,489-3,533 ft., flowed 1,160 bbl.; W. C. McBride, Inc.'s No. 1 Fyke heirs, old well deepened from 1,785 ft. to McClosky lime at 1,830-60 ft., shot with 60 qt., pumped 280 bbl.

In Clay County Pure Oil Co.'s No. 2 Mosely-B, Section 3-2n-8e, pumped 98 bbl. from Cypress sand at 2,584-2,618 ft.; Kingwood Oil Co.'s No. 1 F. Neff, Section 14-2n-7e, dry and abandoned at 3,207 ft.; Pure's No. 1 Zimmerman, Section 25-2n-7e, 35-bbl. well, total depth 3,002 ft.; Pure's No. 1 Staley Oil Co., Section 24-2n-7e, 7 bbl. in 12 hours, total depth 3,104 ft.; Pure's No. 1 C. Bates-A, Section 8-1n-8e, pay at 3,003-39 ft., flowed 765 bbl.

In Wabash County Big Chief and Mohawk's No. 1 Seibert, Section 34-2n-13w, 2,709-15 ft., flowed 539 bbl.; Big Chief Drilling Co.'s No. 2 Summers, Section 3-1n-13w, 2,682-96 ft., pumped 100 bbl.; Huff and others' No. 1 Cox, Section 3-1n-13w, McClosky pay 2,689-2,702 ft., pumped 100 bbl.; Bander and others' No. 3 Seibert, Section 4-1n-13w, McClosky at 2,696-98 ft., pumped 75 bbl.; Bander and others' No. 1 Summers, Section 3-1n-13w, dry and abandoned at 2,722 ft.; Burr & Lambert's No. 1 Lieber, Section 27-1s-13w, 2,616-23 ft.; pumped 192 bbl. All the wells had been acidized.

In Crawford County Bell Brothers' No. 1 Wampler, Section 1-5n-12w, total depth 3,110 ft., dry and abandoned.

In Jasper County Pure Oil Co.'s No. 2 Billings, Section 31-5n-10e, total depth 2,850 ft., pumped 157 bbl.

In Richland County Pure Oil Co.'s No. 5 Coen, Section 36-5n-9e, dry and abandoned at 2,930 ft. C. Robinson and others' No. 1 Jenner, Section 26-2n-10e, dry and abandoned at 3,326 ft.

In Bond County Seaboard Oil Co.'s No. 1 Trembly, Section 22-5n-3w, dry and abandoned at 2,372 ft., Devonian lime top at 2,234 ft.

In Clark County Allen & Sherritt's No. 1 Biggs, Section 9-11n-14w, Trenton pay at 2,420-30 ft., 1,500 gal. of acid, 11 bbl. of oil and 14 bbl. of water. Harry Dunn and others' No. 1 Metzgar, Section 7-9n-12w, dry and abandoned at 1,460 ft.

Centralia Field

In the Centralia field in Clinton and Marion counties, Shell Oil Co.'s No. 12-C Criley, Section 35-2n-1w, Devonian pay at 2,886-2,905 ft., flowed 8,112 bbl. in 24 hours. Shell's No. 11-C Criley, Section 35, 2,875-94 ft., flowed 6,049 bbl.

Samedan Oil Co.'s No. 3 Lippert-Felton, Section 1-1n-1w, 2,872-87 ft., 2,228 bbl. Taylor Drilling Co.'s No. 1 Felton, Section 1-1n-1w, 2,921 bbl. Sims' No. 1 Ellerman, Section 1-1n-1w, 3,509 bbl. Shell's No. 3 Adams and others, Section 1-1n-1w, 2,870-90 ft., 2,505 bbl. Lee's No. 2 Hausemann, Section 1-1n-1w, 2,905-14 ft., 724 bbl. B. Fields' No. 1 Kolmer, Section 1-1n-1w, 2,899-2,918 ft., 1,383 bbl. Fields' No. 1 Buehler, Section 1-1n-1w, 2,896-2,916 ft., 2,208 bbl. Shell Oil Co.'s No. 3-C Geary-Criley, Section 2-1n-1w, 2,865-85 ft., flowed 5,835 bbl. Vic Nittell, No. 1 Millmaker, Section 24-1n-1w, 2,927-35 ft., 415 bbl. of fluid, 60 per cent water.

In Monroe County C. T. Judd's No. 3 Kolmer, Section 24-2s-10w, Trenton lime at 506-18 ft., shot with 60 qt., pumped 30 bbl. of oil and 60 bbl. of water.

In Township 9n-3e, Louden field, Fayette County, Stewart's No. 3 Gordon, Section 35-9n-3e, 1,508-45 ft., pumped 55 bbl.; No. 4 Gordon, Section 35, 1,536-46 ft., pumped 60 bbl. In Township 8n-3e Carter Oil Co.'s No. 12 Wright, Section 20, 1,537-40 ft. and 1,539-42 ft., pumped 108 bbl. of oil and 36 bbl. of water; Carter's No. 3 Logue, Section 23, 1,453-60 ft., pumped 126 bbl.; Carter's No. 3 Rhodes, Section 26, 1,589-1,610 ft., 36

(Continued on Page 143)

INDIANA

EVANSVILLE, Ind., June 24.—Three oil wells, one of which was good for 200 bbl. in 48 hours; one gas well and nine dry holes were completed in Indiana, according to the past week's report. Fourteen new operations were started.

Kentucky Natural Gas Co.'s No. 1 Harvey, NW SW NW Section 4-8s-6w, Spencer County, was a 700,000-cu. ft. gas well at 622-23½ ft. Mecca Oil Co.'s No. 1 Seay, NW NW SW Section 32-7s-6w, was dry and abandoned at 917 ft.

In Warrick County L. B. Jackson and others' No. 1 Schumacher, NE NW NW Section 34-3s-8w, was dry and abandoned at 1,803 ft. It had sulfur water at 1,802 ft., 210 ft. below the top of the Ste. Genevieve lime.

In Posey County Harry Sandler and others' No. 1 Keck, NE cor. SW NW Section 34-3s-14w, was shot with 20 qt. at 2,787-2,813 ft. and flowed 400 bbl. in 2 days; completed.

In Gibson County Joe Bander and others' No. 33 Cooper, NE cor. SW NE Section 24-3s-14w, total depth 3,000 ft., was plugged back to 2,106 ft. and tested water. It was abandoned. L. B. Jackson's No. 1 Bauer, SW SE SE Section 10-2s-9w, was acidized with 500 gal. in McClosky lime at 1,627-35 ft. and pumped 80 bbl. in 24 hours; completed. W. C. McBride, Inc.'s No. 1 Blair, SE SE NW Section 13-2s-12w, was dry and abandoned at 2,425 ft. St. Louis lime was topped at 2,356 ft. K. T. & F. Oil & Development Co.'s No. 1 Shoultz, NE NE SE Section 18-1s-9w, was dry and abandoned at 1,262 ft.

In Floyd County L. A. Albertson's No. 1 McKown, SW SE SE Section 32-1s-5e, was shot with 50 lb. of powder at 794-96 ft. and showed oil and water. It was abandoned at 1,000 ft.

In Daviess County J. W. Cannon and others' No. 2 Evans, SW SE NE Section 8-2n-5w, made a 25-bbl. well from sand at 624-32 ft. It had not been shot.

In Decatur County Hoosier Public Utilities Co.'s No. 211 Keaton, C SW SW Section 11-9n-9e, had Trenton lime at 874 ft., pay at 876-915 ft., total depth, and produced 221,000 cu. ft. of gas in 24 hours.

(Continued on Page 130)

OHIO

NEWARK, Ohio, June 24.—Nine gas wells, three oil wells and 10 dry holes were reported in the fields covered in this report. Six of the dry tests were drilled through the Clinton.

In Athens County, Carthage Township, Cooper & Lamp's No. 1 C. L. Stout, Fraction 3, Keener sand dry, depth 1,285 ft.

In Guernsey County, Millwood Township, M. J. Purdy's No. 2 L. L. Hall, Section 16, is a gas well in the Berea, gaging 75,000 cu. ft., depth 1,631 ft.

In the Newark field, Licking County, Newark Township, Ohio Fuel Gas Co.'s No. 1 W. W. Long, gages 414,000 cu. ft. of gas, open flow, Clinton at 2,443-74 ft.; Rutlege & Mossholder's No. 1 in Hall's Addition, open flow of 300,000 cu. ft. of gas, Clinton at 2,311-26 ft.; Penick and others' No. 1 V. C. Wright, dry in the Clinton, depth 2,433 ft. In Newton Township Wade Smith and others' No. 1 S. Hickenbotham, Clinton dry.

(Continued on Page 138)

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West, Central and Panhandle Texas

By
D. H. STORMONT

Crockett's Latest Prospect Field Extensions Numerous

MIDLAND, Tex., June 24.—Crockett County was virtually assured a new producing spot 9 miles east of the Noelke field. Moore Exploration Co.'s No. 1 Hoover, Section 16, Block 1, G.C.&S.F. Survey, after drilling several zones showing oil, had casing cemented at 1,984 ft. Plug was drilled and the hole deepened. It was shot with 360 qt. from 2,017 to 2,145 ft. While cleaning out oil rose 1,350 ft. in the 5½-in. casing. An 8-hour swabbing test recovered 40 bbl. of oil. Swabbing and testing continued.

Winkler County

Indicating a new producing area between the O'Brien and the Halley fields in southern Winkler County, Gulf Oil Corp.'s No. 136 O'Brien drilled several zones of possible production early in the past week. At 2,770 ft., after drilling a section showing oil from 2,740 to 2,750 ft., the wildcat was bailed dry and tested 5 gal. of oil per hour. Additional shows of oil were found at 2,774-84 ft. At 2,787 ft. the hole was again bailed dry and tested 30 gal. of oil hourly. It was last reported drilling below 2,850 ft. in lime.

Southern Andrews County

Atlantic Refining Co. and Helmerich & Payne, Inc.'s No. 1 University, indicated field opener in Andrews County, was running tubing for a production gage. The wildcat is in Section 11, Block 11, University Lands Survey. The hole has been cleaned out to bottom at 4,475 ft. and the indicated pay section was shot with 500 qt. of nitroglycerin; it was given 11,000 gal. of acid in three treatments. Two miles south is Atlantic Refining Co.'s No. 1-23 University, Section 23, Block 11, University Lands Survey, last reported drilling in lime below 3,790 ft. Offsetting the discovery to the north is Atlantic Refining Co.'s No. 1-2 University. The well is bottomed at 2,210 ft. and is awaiting cement after setting 7-in. casing at 4,192 ft.

Wildcat Areas

In Ward County Sinclair Prairie Oil Co. reported plans to drill a 3,100-ft. test, supposedly in the NE cor. NW Section 32, Block 4, H.&T.C. Survey.

In Reagan County, 6 miles west of Stiles, R. E. Ringo, Los Angeles, will drill No. 1 Ringo, 1,320 ft. from the north and west lines of Section 22, Block K, about 1½ miles northwest of the old Centralia stagecoach station.

In Mitchell County two wildcat tests were cleaned out after they were shot. N. V. Hilbun's No. 1 Strain, 1 mile south of the Ira field of southern Scurry County, filled 150 ft. with oil before it was shot with 150 qt. at 1,701-1,801 ft. Bottom was not yet reached for determining further production following the shot. The well is 330 ft. from the south and east lines of Section 82, Block 97, H.&T.C. Survey.

About a mile southwest of the Hilbun test, B. R. S. Oil Co.'s No. 1 Berry, 467 ft. from the south and east lines of Section 83, same block and survey, had 400 ft. of oil in the hole while cleaning out after a shot with 250 qt. at 1,739-93 ft.

WEST CENTRAL TEXAS

FORT WORTH, Tex., June 24.—A 1½-mile-northeast extension for the Fagg area in Stephens County, together with a mile-southeast extension for the Loving field of the same county, featured the developments of the week in the West Central Texas district.

Jones Brothers Drilling Co., Dallas, Tex., completed No. 1 TXL, Section 3, Block 3, S.P. Survey, for 42 bbl. daily, flowing, from the Marble Falls section at 3,999-4,018 ft. The section was given a 10-qt. shot from 3,995 to 4,005 ft. The new well is the third for the area.

Although reported discovered last year by George Fagg's No. 1 Richardson, NW SE Section 5, same block and survey, the first completion for the field was registered in October 1937 when George Fagg and others completed No. 1 J. Q. Corbett, Section 2, Block 3, S.P. Survey. The real discovery well, which was drilled in 1937, is about a mile north and slightly east of Jones Brothers Drilling Co.'s recent extension. George Fagg's No. 1 Richardson, the completion of last year, is about 2½ miles southwest of the discovery well drilled in 1937.

The old No. 1 Corbett was gaged at 89 bbl. daily after drilling only a few feet into the Marble Falls section. The Jones Brothers Drilling Co.'s No. 1 TXL is reported to have penetrated about 19 ft. into the pay section, but after a 10-qt. shot it failed to make as good a well as either of the two previous completions in the field.

Panhandle Refining Co. abandoned No. 1 Frank Magers, SW SE Section 1, Block 3, S.P. Survey. The outpost was about 1⅛ miles west of the original 1937 discovery well and about 1⅝ miles north of Fagg's completion of last year. Water was found in the lime in drilling to a total depth of 4,037 ft.

Loving Field

An outpost a mile southeast of the Loving field of Setphens County has been completed. It is Pitzer & West and Brazos-Young Oil Corp.'s No. 1 H. Compton, Section 9, Orphan Asylum Lands Survey. It was drilled to 3,980 ft., but was plugged back to 3,535 ft. and given 12,000 gal. of acid in the pay section at 3,425-3,536 ft. It was completed for 20 bbl. of oil daily, pumping.

Carbon Area

A new completion has been registered in the Carbon area of Eastland County by Dobbs Oil Corp., Dallas, Tex. It is a west offset to the company's field discovery of last year, No. 1 Greer. Located in the S. H. Key Survey and offsetting the No. 1 Greer, Dobbs' No. 1 Thomason gaged 243 bbl. of oil daily, flowing through 2-in. tubing from pay at 2,560-2,658 ft., in Caddo lime. A reported 95-ft. section of saturation was drilled.

In the same area Dobbs Oil Corp. is drilling No. 1 R. L. Poe, 1,320 ft. from the south and east lines of SE Section 37, Block 3, H.&T.C. Survey .

WEST CENTRAL TEXAS FIELD COMPLETIONS

(24-hour gages)

Coleman County

Grosvenor field: Roark's No. 1 Dibrell, dry and abandoned at 1,700 ft.

Erath County

A wildcat, Jackson's No. 1 Taylor, W. S. Prater Survey, Abstract 1029, dry and abandoned at 3,395 ft.

Jones County

Ivy field: M. Hughes' No. 3 Martin, dry and abandoned at 1,962 ft.

Taylor County

A wildcat, Hose's No. 1 Bond, Section 40, B.A.L. Survey, junked hole and abandoned at total depth of 4,720 ft.

Stephens County

Fagg field: Jones Brothers Drilling Co.'s No. 1 TXL, 3,999-4,018 ft., made 42 bbl. daily, flowing, after 10-qt. shot.

Stribling field: W. B. Omohundro's No. 1 Dance, 3,561-3,608 ft. and 3,651-65 ft., 165 bbl., pumping.

Loving field: Pitzer & West's No. 1 Compton, 3,428-3,536 ft., 20 bbl., pumping.

PANHANDLE FIELD COMPLETIONS

(24-hour gages)

Gray County

Stanolind Oil & Gas Co.'s No. 9 Hood, 3,180-3,265 ft., 184 bbl. Southern Petroleum Exploration Co.'s No. 7 McConnell, 3,150-3,265 ft., 110 bbl. F. H. Yealey's No. 4 Crank, 3,210-95 ft., 248 bbl.

Hutchinson County

Phillips Petroleum Co.'s No. 46 Cockrell, 2,975-3,050 ft., 385 bbl. Phillips Petroleum Co.'s No. 25 Perkins, 2,960-3,085 ft., 119 bbl. Skelly Oil Co.'s No. 4-B Watkins, 2,995-3,090 ft., 404 bbl. Texas Co.'s No. 25 Lewis, 3,010-64 ft., 355 bbl.

Indiana Fields

(Continued from Page 128)

In Huntington County M. J. Anderson's No. 1 Hays, NW NW SW Section 6-26n-10e, a Trenton lime test, was dry and abandoned at 1,033 ft.

In Jasper County Clapsaddle & Harris' No. 1 Allen, NE cor. SE NE Section 34-32n-5w, had Trenton lime at 940 ft., water at 970 ft., and drilled to 1,200 ft., where it was abandoned.

In Posey County Ray Ryan's No. 1 Keck, NW SE NW Section 34-3s-14w, was shot with 20 qt. at 2,786-2,813 ft., and flowed by heads 20 bbl. per hour. It was not yet completed.

In Posey County J. W. Chamberlain's No. 1 Shawhan in Donation 121-1s-10w, was shot with 20 qt. at 1,641-44 ft. and responded with water. It was shut down for owners' orders.

In Randolph County Godwin and others' No. 1 St. John, C NE NE Section 8-21n-12e, was shot with 60 qt. at 1,259-69 ft., and swabbed 3 bbl. of oil and 25 bbl. of water. It was abandoned.

New Operations

First reports on new operations included the following:

In Posey County O. F. Kelly and others' No. 3 Hahn, SW SW NW Section 1-7s-12w, set 10-in. casing at 45 ft. Creager, Lewis and others' No. 1 Diet, NE NW SE Section 1-7s-12w, set 10-in. casing at 48 ft. Superior Oil Co.'s No. 27 New Harmony, 1,850 ft. from south and 300 ft. from west lines, SE Section 8-5s-14w, drilling at 1,015 ft. Harry Sandler's No. 2 Keck, 1,150 ft. from south and 800 ft. from west lines, NW Section 34-3s-14w, rigging up rotary.

In Spencer County L. L. Benoist, trustee's No. 2 Crowder, 640 ft. from west and 200 ft. from north lines, SW SW Section 7-7s-7w, drilling at 380 ft.

In Gibson County B. Brown and others' No. 1 Sullivan, C SE NW SW Section 20-3s-13w, rig up. Lewis Production Co.'s No. 4 Cooper-A, NE NE SE Section 13-3s-14w, rigging up rotary. Hollandsworth Brothers' No. 5 Cooper, 165 ft. from north and 330 ft. from west lines, SE NE Section 24-3s-14w, location. L. B. Jackson and others' No. 1 Keeton, NW cor. NE NE Section 15-2s-9w, rig up.

In Daviess County Newton Pipe Line Co.'s No. 1 Brittain, NE NE SW Section 15-1n-5w, drilling at 165 ft. P. & H. Drilling Co.'s No. 1 Hart, SE cor. SW SW NW Section 4-2n-5w, rigging up machine. Newton Pipe Line Co.'s No. 1 Connelly, SE SE NE Section 33-2n-6w, drilling at 1,665 ft. Hartman and others' No. 1 White, 1,120 ft. from north and 200 ft. from west lines SW Section 22-2n-7w, drilling at 1,600 ft.

In Decatur County Hoosier Public Utilities Co.'s No. 212 Harpring, C SW NW Section 14-9n-9e, set 8¼-in. casing at 50 ft.

Kansas Developments

By
DAL DALRYMPLE

Biggest Nebraska Well; New Tests in Kansas Basin Area

WICHITA, Kans., June 24.—The Forest City basin held attention of Kansas operators at the week end as the Falls City, Neb., pool was extended to less than 3 miles of the Kansas-Nebraska boundary by its biggest producer to date. The first oil discovery well in the Kansas sector of the basin was completed, and new tests were started in Jefferson, Douglas and Nemaha counties. Meanwhile, activity in western Kansas fields continued at a comparatively fast clip, with several large producers completed and 36 new tests reported. New operations included wildcats in McPherson, Stafford and Rice counties as well as those in northeastern Kansas.

Newest and biggest producer in the Falls City, Neb., pool is Harry Harper's No. 1 Sibbernsen, SE NE NW Section 20-1n-16e, farthest southeast of the trio of producers and within the third line of sections north of Kansas. It had initial flow of 744 bbl. of oil daily after acid treatments of 930 and 3,000 gal. It is believed to have settled to around 500 bbl. daily, flowing, although no potential test was made before it was shut in. Optimists estimated it might produce as much as 1,500 bbl. on the pump. Seven-inch casing was set on top of Hunton lime at 2,210 ft., rotary tools were replaced with cable equipment and hole was drilled to 2,236 ft. Location is ¾ mile southeast of Pawnee Royalty Co.'s No. 1 Bucholz, C NW SW Section 17-1n-16e, second producer in the pool, which started in at 330 bbl. daily but is pinched in to 50 to 100 bbl. daily as operators try for the state bonus of $15,000 for the first Nebraska well to yield 50 bbl. or better for 60 consecutive days. The Falls City discovery well, Pawnee's No. 1 Boice, NE NE Section 18-1n-16e, is shut in.

Another Richardson County, Neb., test gave promise of being a possible producer, according to reports. It was Uhri Oil Co.'s No. 1 Ogle, NE NW SE SE Section 9-1n-14e, about 11 miles west of the Falls City pool. Operators were said to have taken a saturated core from Hunton lime topped at 2,255 ft. They did not confirm or deny the report, but were preparing to run pipe.

Operations were due to start right away at a wildcat 16 miles southeast of Seneca, Nemaha County, Kans. Deal for this well, the No. 1 Achten, C S half SE NW Section 12-4s-14e, was started by Hubbard & Bumpass of Kansas City, and has been taken over by Jerry Ladd, who recently drilled a well in Mercer County, Mo., and George Vincent, who recently drilled in Platte County, Mo. Location is on a Carter-Amerada-Derby farmout, with those companies and Blackwell Oil & Gas Co. supporting the test.

Dan McLaughlin was preparing to spud his No. 1 Darks, SW NW Section 4-10-20, between his oil and gas discovery wells in Jefferson County. Davis & Helm were due to spud soon at a Jefferson County wildcat in Section 9-11-19, and Kerlyn Oil Co. started work at a wildcat in Section 20-13-20, southeast of Lawrence, Douglas County.

Developments elsewhere in Kansas were as follows:

Wildcat Operations

McLaughlin & Young's No. 1 McLeod, C NW SW Section 4-10-20, oil discovery in Jefferson County, Kansas sector of the Forest City basin, was completed for initial potential of 38 bbl. of oil and 3 bbl. of water in 24 hours. Production was from Mississippi lime at 1,475-1,594 ft., total depth 1,596 ft. Location is ¼ mile southwest of the same operators' discovery well in the McLouth gas area.

Gulf Oil Corp. and associates opened an oil pool in Ellis County at No. 1 Sander, C N½ SW SE Section 30-13-16w, about 5 miles southwest of the Emmeram pool. It had Arbuckle lime at 3,450-58 ft., total depth, was acidized, pumped 104 bbl. of oil and 48 bbl. of water in 8 hours, making potential of 312 bbl. of oil, with 144 bbl. of water.

Wildcat failures included: Magnolia Petroleum Co.'s No. 1 Smith, CEL NE NE Section 12-21-16w, Pawnee County, Arbuckle lime 3,764 ft., total depth 3,787 ft., abandoned; Foster Oil Co.'s No. 2-A Howard, CEL SW SW Section 8-34-4, Cowley County, Arbuckle 3,842, total depth 3,876, abandoned; Barwick & Sheridan's No. 1 Warren, CWL NW NW Section 18-35-6, Cowley County, Mississippi 3,198 ft., total depth 3,211 ft., abandoned; E. B. Shawver's No. 1-B Widener, SW SE NW Section 11-30-4, Cowley County, Arbuckle 3,226 ft., total depth 3,245 ft., abandoned; Cities Service Oil Co.'s No. 1 Kanak, SW cor. Section 12-16-8w, Ellsworth County, Arbuckle 2,952 ft., total depth 2,970 ft., abandoned; Finston and others' No. 1 Siemsen, W½ NW SE Section 3-17-10w, Ellsworth County, Arbuckle 3,375 ft., total depth 3,390 ft., abandoned.

New wildcats: Kerlyn Oil Co.'s No. 1 Whedon, C NE NE Section 20-13-20, Douglas County, spudded; Stanolind Oil & Gas Co.'s No. 1-A Charles, N½ NE SE Section 15-24-12w, Stafford County, moving in material; Progressive Oil Co.'s No. 1 Chavez, W½ SW NW Section 26-20-2w, McPherson County, spudded; Republic Natural Gas Co.'s No. 1 Bean, CEL NE SW Section 23-19-6w, rigging up rotary; Stanolind's No. 1 Ahnert, W½ SE NE Section 10-22-12w, Stafford County, location.

The Davis-Helm and others' No. 1 Green, SW S½ NW Section 9-11-19e, is the corrected location of a wildcat in southern Jefferson County, about 8 miles south of Oskaloosa. It originally was reported as being the No. 1 Julian, SW SW NW Section 9-11-19. Material has been moved in and the operators, F. C. Davis and E. C. Helm, were preparing to spud.

Completions in Pools

Russell County: Stanolind's No. 1 Hefferman, Section 4-15-13w, Hall pool, total depth 3,232 ft., abandoned; Coralena's No. 4 Trapp, Section 29-15-13w, Trapp field, Arbuckle 3,308-13 ft., total depth, 150 bbl.; Mid-Continent Petroleum Corp.'s No. 4 Ochs, Section 35-15-14w, Trapp field, Arbuckle 3,323-31 ft., total depth, swabbed 250 bbl. in 5 hours, potential 1,384 bbl.; Coralena's No. 2 Ehrlich, Section 19-14-13w, Hall pool, Lansing 2,913-55 ft., total depth, 120 bbl.; same company's No. 1 Graham, Section 21-14-13w, Lansing 2,925-32 ft., estimated 150 bbl.; Helmerich & Payne's No. 2 Boxberger, Section 21-14-14w, Gurney area, Lansing 3,000-3,096 ft., total depth, pumped 1,018 bbl. in 8 hours, potential 3,054 bbl.; Stanolind's No. 3 Witt, Section 10-14-15w, Gorham pool, Lansing 2,757-60 ft., total depth 3,296 ft., 31 bbl.; same company's No. 5 Boxberger, Section 14-14-14, Gurney area, total depth 3,070 ft., potential 1,387 bbl.; R. H. Shield's No. 1-A Gross, Section 5-15-13w, Hall area, dry and abandoned at 3,206 ft.; El Dorado Refining Co.'s No. 1 Kuhnle, Section 4-15-12w, total depth 3,212 ft., 583 bbl.

McPherson County: Prunty Production Co.'s No. 1 Jones, Section 31-21-1w, Graber pool, Hunton 3,260-85 ft., total depth, pumped 196 bbl. in 8 hours, potential 588 bbl.; Republic's No. 3 Swanson, Section 18-20-5w, Bornholdt area, chat 3,307-49 ft., total depth, 3,000 bbl.; W. H. Moulton's No. 2 Bornholdt, Section 30-20-5w, chat 3,302-69 ft., total depth, 176 bbl.; Sunray's No. 2 Mattson, Section 30-20-5w, chat 3,297-3,378 ft., total depth, 42 bbl.; Crosbie, Inc.'s No. 1 Briggs, Section 20-20-5w, total depth 3,379 ft., 520 bbl.; Bradley Brothers' No. 3 Mattson, Section 30-20-5w, total depth 3,336 ft., 3,000 bbl.

Rice County: Finston's No. 2 Gum, Section 34-19-10w, Silica field, Arbuckle 3,290-3,302 ft., total depth, pumped 720 bbl. in 18 hours, calculated potential 2,745 bbl.; Skelly's No. 5 McGuire, Section 34-19-10w, Silica, Arbuckle 3,301-07 ft., total depth, 19 bbl.; McPherson Drilling Co.'s No. 1-C Cramm, Section 10-19-9w, Chase field, total depth 3,363 ft., abandoned; Hartman and others' No. 2 Snyder, Section 12-20-6w, Bornholdt area, total depth 3,369 ft., 432 bbl.; Continental's No. 2 Carlson, Section 36-20-6w, Bornholdt, total depth 3,350 ft., 346 bbl.; El Dorado Refining Co.'s No. 1 Oden, Section 6-21-7w, Wherry pool, total depth 3,354 ft., abandoned.

Ellsworth County: Continental's No. 4 Fuller, Section 28-17-8w, Edwards pool, pumped 174 bbl. in 4 hours, potential 3,000 bbl.; Central's No. 2 Francis, Section 19-17-9w, Wilkens area, Arbuckle 3,252 ft., abandoned; Cities Service's No. 2-C Mollhagen, Section 29-17-9w, Arbuckle 3,253 ft., total depth 3,325 ft.; temporarily abandoned; Pryor & Lockhart's No. 2 Stratman, Section 2-17-10w, Stratman pool, Arbuckle 3,272-86 ft., total depth, 3,000 bbl.; Atlantic's No. 1-A Stoltenberg, Section 27-16-10w, Stoltenberg pool, total depth 3,298 ft., 3,000 bbl.; Lario's No. 2 Mehl, Section 35-16-10w, total depth 3,286 ft., 3,000 bbl.

Barton County: Stanolind's No. 16 Stueckemann, Section 11-20-11w, Silica field, Arbuckle 3,271-84 ft., total depth, 2,519 bbl.; Gulf's No. 5 Zahorsky, Section 14-20-11w, Silica, Arbuckle 3,264-74 ft., total depth, 3,000 bbl.; Stanolind's No. 1-A Eefeld, Section 28-16-11w, Prusa, Arbuckle 3,347-68 ft., total depth, pumped 188 bbl. in 8 hours, potential 565 bbl.; Sinclair Prairie's No. 2 McLean, Section 25-17-11w, Bloomer area, Arbuckle 3,318-22 ft., total depth, 22 bbl.; Indian Territory's No. 6-A Hoffman, Section 1-16-14w, Trapp field, total depth 3,322 ft., 1,384 bbl.; Shell's No. 7-B Ehrlich, Section 1-16-14w, total depth 3,306 ft., 146 bbl.; Phillips' No. 6 Bitter, Section 6-16-13w, Trapp, total depth 3,353 ft., 3,000 bbl.; Stanolind's No. 6 Hauser, Section 16-20-11w, Silica, total depth 3,295 ft., 600 bbl.

Ellis County: Derby's No. 8 Henderson, Section 7-11-17w, Burnett pool, Arbuckle 3,460-67 ft., total depth, 3,000 bbl.; Bay's No. 3-B Riddler, Section 1-11-18w, Burnett, Arbuckle 3,406-10 ft., total depth, 3,000 bbl.; Central's No. 1 Marshall, Section 24-11-18w, total depth 3,648 ft., abandoned; Lario's No. 4 Pearl, Section 13-11-17w, Bemis field, total depth 3,378 ft., 3,000 bbl.; Cities Service's No. 13 Collahan, Section 24-11-17w, Bemis, total depth 3,387 ft., 3,000 bbl.

Cowley County: Wixon and others' No. 1-A Aylward, Section 9-31-7, Clover pool, total depth 1,210 ft., 2,390,000 cu. ft. of gas; Garden and others' No. 1 Waldschmidt, Rahn pool, total depth 2,982 ft., abandoned; E. B. Shawver's No. 2 Davis, Section 21-30-4, total depth 3,252 ft., abandoned.

Gas wells: United Producing Co.'s No. 1 Stewart, Section 27-29-35w, Grant County, Winfield pay 2,514-2,737 ft., total depth, 5,000,000 cu. ft. of gas; Barbara's No. 1 Thompson, Section 9-33-13w, Medicine Lodge field, Barber County, Mississippi 4,735-43 ft., total depth, 31,000,000 cu. ft. of gas; Skelly's No. 3 South Maxedon, Section 25-27-11w, Cunningham field, Pratt County, Viola 3,998-4,018 ft., total depth, 67,000,000 cu. ft. of gas; Skelly's No. 2 West Maxedon, Section 25-27-11w, Pratt County, Viola 4,035-55 ft., total depth, 58,000,000 cu. ft. of gas.

Miscellaneous: Schaffer's No. 16-A Schneider, Section 15-23-13, Greenwood County, Mississippi 1,712-22 ft., total depth 1,723 ft., 10 bbl.; Reed and others' No. 2 Dove, Section 17-28-11, Greenwood County, total depth 1,222 ft., 25 bbl.; Whittiker and others' No. 1 Adams, Section 17-28-11, Greenwood County, total depth 1,120 ft., 30 bbl.; Cromwell & Lewis' No. 1-A Clark, Section 3-28-5, Haverhill area, Butler County, Simpson 3,078-86 ft., total depth, 38 bbl.; Skelly's No. 1-E Kipp, Section 26-25-14w, Kipp pool, Stafford County, Lansing 3,836-38 ft., total depth 3,909 ft., 568 bbl.; British-American's No. 2 Belt, Section 13-20-16w, Pawnee Rock pool, Pawnee County, total depth 3,833 ft., 87 bbl.; Continental's No. 1 Desaire, Section 10-9-21w, Morel area, Graham County, total depth 3,743 ft., abandoned.

North and East Texas

By
D. H. STORMONT

Test 3 Miles Northeast of Seay Field Is Showing Oil

WICHITA FALLS, Tex., June 24.—Sinclair Prairie Oil Co.'s No. 1 T. H. Milam, Abel Beason Survey, 3 miles northeast of W. B. Omohundro's No. 1 Wilmer Seay, discovery well of the Seay field, drilled from 5,683 to 5,685 ft. and cored from that point to 5,691 ft. The recovery was 1 ft. of shale, 2½ ft. of lime, showing oil, and a thin section of conglomerate showing slight traces of oil. A core from 5,691 to 5,707 ft. recovered 9 ft. of broken shale, lime, and conglomerate with streaks of saturation. A drill-stem test was scheduled to be made to determine whether the well will be tested at its present depth or drilled deeper.

Offsetting the discovery well to the northwest, Fain-McGaha Oil Corp.'s No. 1 Earl Spring, Section 33, Block 4, H.&T.C. Survey, was being swabbed in an attempt to make the well flow.

Ross Field

A quarter-mile-southwest spread for the Ross field in northwestern Clay County was indicated by Continental Oil Co.'s No. 1-A Ross, J. Wyont Survey. No. 1-A Ross flowed after an acid treatment and cleaned itself into pits for 30 minutes. When turned into tanks it made 100 bbl. of oil in 1 hour. The company has moved in rig for No. 2 Ross and plans a steady development program.

K.M.A. Ordovician

Magnolia Petroleum Co.'s prospective extension to the Ellenburger lime producing portion of K.M.A. field in Wichita and Archer counties, has been completed. It is No. 3 Thom, Spillers Survey, and made 62 bbl. of oil and 58 bbl. of water on a 24-hour pumping gage. Found to be about 100 ft. lower, structurally, than Fain-McGaha Oil Corp.'s discovery well, there is some possibility expressed of a deep-seated, low-angle fault between the wells.

Amerada's Wilbarger Field

Failing to find any increase in oil showings, Amerada Petroleum Corp.'s No. 1 Goodpasture, Section 35, Block 15, H.&T.C. Survey, Wilbarger County, was drilling below 6,400 ft. The test had indicated production from the Ellenburger lime last week at a total depth of 6,333 ft., where 15 bbl. of oil was swabbed hourly. Despite its drilling deeper to complete an 8,000-ft. contract, commercial production is still believed possible from the saturated section drilled from 6,309 to 6,333 ft.

Wildcat Block

Walter Gant, Ardmore, Okla., reported acquiring a 6,000-acre block in northern Wilbarger County, Texas, and southern Jackson County, Oklahoma. Mr. Gant plans a 6,000-ft. wildcat near Odell and on the C. F. Mock lands. Some of the acreage falls in the H.&T.C. Survey, the C.T.&M. Survey, and the I. Lindsey Survey. In southern Oklahoma the block includes acreage out of Sections 20, 21, 28, 29, 31, 32, and 33-1s-20w.

NORTH TEXAS COMPLETIONS

Archer County

Bridwell Oil Co.'s No. 3 F. C. Green B, 1,130-48 ft., 65 bbl. British American Oil Producing Co.'s No. 2 T. B. Wilson, 4,690-4,830 ft., 87 bbl. Cable Oil Co.'s No. 12 C. H. Thawley, 978-89 ft., 10 bbl. Cable Oil Co.'s No. 13 C. H. Thawley, abandoned location. Dillard and others' No. 7 A. P. Nichols, 4,340-4,409 ft., 1,243 bbl. Gulf Oil Corp.'s No. 18 P. Siegel, 3,718-80 ft., 720 bbl. Helmerich & Payne's No. 15 L. F. Wilson, 3,860-79 ft., 890 bbl. Bert L. Ligon and others' No. 6 L. F. Wilson, 4,333-93 ft., 611 bbl. Magnolia Petroleum Co.'s No. 3 Fred Thom, 4,417-23 ft., 62 bbl., Ellenburger well, K.M.A. Peterson & McCarty's No. 34 L. F. Wilson B, 4,298-4,328 ft., 840 bbl. Petroleum Production Co.'s No. 5 J. N. Shepherd, 4,295-4,334 ft., 770 bbl. Phillips Petroleum Co.'s No. 5 Dr. J. A. Little, 4,355-91 ft., 965 bbl. Roeser-Pendleton, Inc.'s No. 1 J. R. Parkey, 4,921 ft., dry. Waldo E. Stephens' No. 1 Ned C. Griffin, abandoned location. E. D. Whitaker's No. 1 A. D. Britton, 712 ft., dry.

Clay County

L. T. Burns' No. 1 Tom Watson, 5,151 ft., dry. E. N. Costley and others' No. 5 W. J. McInnes B, 254-60 ft., 10 bbl.

Cooke County

Gill & Witherspoon's No. 2 Mary Luke, abandoned location. Harvey and others' No. 3 O. Wilson, abandoned location. Kingery Brothers and others' No. 9 Alice Johnson, 1,161-83 ft., 75 bbl. Magnolia Petroleum Co.'s No. 6 S. L. Ramsey, 4,700-59 ft., 235 bbl. J. G. Richards' No. 1 R. W. Trew, abandoned location. Dr. J. Q. Spradlin's No. 3 R. W. Trew, 671-786 ft., 30 bbl. Staley and others' No. 1 A. Judy, 1,757 ft., dry. Texas Co.'s No. 20 T. Trubenbach, 731-49 ft., 69 bbl. Trumter Petroleum Corp.'s No. 11 Mrs. C. E. Stacey, 720-39 ft., 10 bbl.

Jack County

B. C. Gilmore's No. 1 F. C. Bloodworth B, 577 ft., dry. Keithley and others' No. 3 J. M. Bloodworth, 347 ft., dry.

Montague County

Conner and others' No. 1 W. O. Reynolds, 4,295-4,323 ft., 985 bbl. Stanolind Oil & Gas Co.'s No. 3 Kate Davis, 5,858 ft., dry.

Wichita County

Blanco & Buchanan Production Co.'s No. 4 Thom, 3,795-3,840 ft., 1,086 bbl. Burk Royalty Co.'s No. 3 C. Birk, 784-806 ft., 8 bbl. Burk Royalty Co.'s No. 4 C. Birk, 801 ft., dry. L. T. Burns' No. 24 First National Co., 3,756-3,838 ft., 638 bbl. Burns & Long's No. 21 Cline-Gauntt, 1,327-40 ft., 10 bbl. S. H. Fagadau's No. 1 E. M. Barnes C, 4,492 ft., dry. W. H. Hammon's No. 7 W. H. Hammon, 3,962-4,050 ft., 336 bbl. W. H. Hammon's No. 10 W. H. Hammon, 3,936-4,010 ft., 368 bbl. Hammon, Hanlon-Buchanan's No. 9 W. H. Hammon, 3,999-4,072 ft., 500 bbl. Hanlon-Buchanan, Inc.'s No. 5 Fassett & Tuttle G, 4,007-57 ft., 276 bbl. Hanlon-Buchanan, Inc.'s No. 7, 4,021-65 ft., 510 bbl. Hanlon-Buchanan, Inc.'s No. 9, 4,044-78 ft., 459 bbl. King Oil Co.'s No. 2 H. F. Harmel, 1,800-18 ft., 5 bbl. Maro Co., Inc.'s No. 2 H. W. Barton, abandoned location. Melat & Graham's No. 7 Munger A, abandoned location. Montgomery and others' No. 4 F. M. Weaver, 1,264 ft., dry. W. B. Omohundro's No. 6 O. M. Jones, 3,979-4,100 ft., 488 bbl. Palmer & Chenault's No. 5 Waggoner, 1,420-31 ft., 9 bbl. Texas Co.'s No. 75 W. B. Honaker, 570 ft., junked. Texas Co.'s No. 5 F. Thom, 3,762-3,849 ft., 760 bbl. A. B. Wharton, Jr.'s No. 8 Waggoner B, 1,581-90 ft., 37 bbl.

Wilbarger County

David Oil Corp.'s No. 1 W. T. Waggoner A, 3,650-71 ft., 530 bbl.

Young County

Gilmore and others' No. 1 H. O. Prideaux, 730 ft., dry. S. D. Glover's No. 25 G. W. Johnson, 565-70 ft., 9 bbl. Graham Roy Co.'s No. 30 North Texas Farms, 760 ft., dry. Graham Roy Co.'s No. 31, 751 ft., dry. T. D. Humphrey's No. 3 S. R. Ragland, 3,760-3,787 ft., 45 bbl. Trentman and others' No. 5 J. K. Guinn, abandoned location. Trentman and others' No. 7, abandoned location.

EASTERN TEXAS

DALLAS, Tex., June 24.—Three miles southeast of Henderson, Rusk County, derrick is up for a 7,500-ft. wildcat, J. S. Harold's No. 1 M. J. Armstrong, Marie del Carmel Survey. It will test Paluxy, Glen Rose, and Travis Peak sections of the lower Trinity. The location is a mile south of J. S. Harold's No. 1 Alford, formerly Nivda Oil Co.'s No. 1 Citizens National Bank, abandoned at 6,802 ft.

A new 4,800-ft. wildcat has been staked in Cherokee County and 4 miles east of Rusk by Texas Co. for No. 1 Cherokee Development Co. It will seek production from Woodbine sand. It is located in the I.&G.N. Survey.

In Red River County Joe White is preparing to start drilling No. 1 Kruth Lumber Co. in the E. Smith Survey about 12 miles north of Clarksville and at the old Allen mill.

In the Willow Springs gas and distillate field of Gregg County, Roger Lacy completed No. 1 Lacy estate, Ford Survey, about a mile northeast and southeast, respectively, of the first and second completions in the field. Acidized with 5,000 gal. from 7,252 to 7,308 ft., the well gaged 84,000,000 cu. ft. of gas daily. Distillate output was gaged at 7 bbl. per 1,000,000 cu. ft. of gas or about 588 bbl. daily. This completion is the largest yet registered in the now three-well field.

EAST TEXAS FIELD COMPLETIONS

(One-hour gages)

Gregg County—Longview Area

T. W. Lee's No. 10 Bumpass, 3,528-68 ft., 50 bbl.

Rusk County—Kilgore Area

Kirby Petroleum Co.'s No. 16 Jeff Reddic, 3,612-3,714 ft., 30 bbl.

Rusk County—Joiner Area

Ohio Oil Co.'s No. 8 H. C. Burton, 3,640-86 ft., 40 bbl. Sinclair Prairie Oil Co.'s No. 21-B Mayfield, salt-water injection well.

Smith County—Joiner Area

Sinclair Prairie Oil Co.'s No. 10 J. B. Wilson, salt-water injection well. Sinclair Prairie Oil Co.'s No. 9-A Jarvis, salt-water injection well.

Upshur County—Longview Area

B. F. Phillip's No. 4-C C. B. Everett, 3,608-10 ft., 40 bbl.

EAST CENTRAL TEXAS FIELD COMPLETIONS

(24-hour gages)

Franklin County

Talco field: Humble Oil & Refining Co.'s No. 17 Penn-fee, 4,207-4,289 ft., 438 bbl.

Freestone County

A wildcat, C. F. W. Young's No. 1 Simmons, dry and abandoned at total depth of 4,055 ft. after top Midway 456 ft., Wilcox 478 ft., Navarro 1,010 ft., Nacatoch 1,054 ft., Taylor 1,607 ft., and Woodbine 4,029 ft.

Gregg County

Willow Springs field: Roger Lacey's No. 1 Lacey estate, 7,252-7,308 ft., made 84,000,000 cu. ft. of gas with 588 bbl. distillate daily.

Houston County Wildcat

A wildcat, G. L. Dixon's No. 1 Crowson, dry and abandoned at total depth of 4,045 ft.

Titus County

Talco field: Adams & Lyles' No. 1 Myers, 4,333-38 ft., 533 bbl.

Oklahoma Operations

By
DAL DALRYMPLE

Deep Exploration in Capital City Field; Pools Are Named

Operators in the Oklahoma City field are seeking new pay zones in the lower horizons in an effort to offset declining production in some of the older wells. Indian Territory Illuminating Oil Co., discoverer of the field on December 4, 1928, will explore lower sections in Arbuckle lime at its No. 27 Trosper Park, SE SW SW Section 12-11-3w, where work was started at the week end. An old producer bottomed at 6,390 ft., it will be deepened approximately 500 ft. It is higher structurally than the average of other wells in the Arbuckle zone and is thought to have a good chance to find production in the lower levels. British American Oil Co. is deepening its No. 1 Green, discovery well in the Capitol extension, but has not indicated how deep it will be drilled. Several wells are at testing stage in the Wilcox zone.

Attention was attracted to Eason Oil Co. and others' No. 1 Wells, NE NW NE Section 15-16-2w, on the east edge of Guthrie townsite in Logan County, when stains and an odor of oil were found in a core at 5,715-21 ft. A 14-in. recovery showed Simpson dense lime with bits of dolomite. Top of the Simpson zone was reported to be 5,700 ft., but geologists differed on this. Hunton lime was found at 5,526-5,560 ft., some 30 ft. lower on structure than a wildcat drilled on the west side of Guthrie, but due to unexpected thinning of other formations above the Simpson, it was checking 169 ft. higher on that zone. The crew was drilling ahead.

Johnson-Kemnitz Drilling Co. and McGraw Oil Co.'s No. 1 Neff-Godfrey, SW SE NE Section 14-6s-6e, once promising wildcat southwest of the Cumberland pool in Marshall County, was due for abandonment at total depth of 5,890 ft. in Arbuckle lime topped at 5,747 ft.

Four pools recently opened were named by the Oklahoma Nomenclature Committee last week and two outpost discoveries were classed as extension wells. The new pools are:

East Okemah pool, discovered at Phillips Petroleum Co. and C. A. Yoakum's No. 1 Johnson, SW NW NE Section 11-11-10, Okfuskee County. The discovery well has initial production of 75 bbl. daily from Cromwell sand at 3,168-77 ft.

Prague pool, opened by H. L. Berkey's No. 1 Wilson, NW cor. Section 4-11-6, Pottawatomie County. Initial yield was 100 bbl. daily from Skinner sand at 3,262-75 ft.

North Cromwell pool, a C. W. Titus discovery in Sections 25 and 26-11-8, where Cromwell sand production was found.

North Talala pool, opened by Oklahoma Oil Corp. in Sections 2 and 11-24-15, Rogers County. Production is from Bartlesville sand.

Alma Oil Co.'s No. 1 Harrington, NW SE NW Section 24-9-4, and J. W. Meazel's No. 1 Billington, SE NE NE Section 26-9-4, Pottawatomie County, were classed as extensions to the West Earlsboro field. Both were Hunton lime producers, with initial yields of 75 and 70 bbl., respectively.

Oklahoma daily average production in the week ending June 22 was 419,325 bbl., an increase from 406,650 bbl. daily the previous week. Oklahoma City production for the week increased from 81,900 bbl. to 102,300 bbl.

Among the Wildcats

Noyes' No. 1 Harris, NE SE NW Section 22-10-7, northwest of the North Bethel pool, Seminole County, had Wilcox sand at 4,456 ft., second sand 4,502 ft., total depth 4,540 ft., perforated casing and acidized without result and was abandoned.

C. H. Marshall's No. 1 Patchin, NE NW NW Section 28-7-18w, about 4 miles southwest of the Hobart pool, Kiowa County, had sandy granite wash at 1,640 ft. and was abandoned with a hole full of water at 2,342 ft.

Kerlyn Oil Co. and others' No. 1 Kavanaugh, C W½ SW NW Section 1-15-4w, Navina area, Logan County, topped Wilcox sand at 6,561 ft., second sand 6,711 ft., and was dry and abandoned at 6,736 ft.

Crawford's No. 1 Boehl, SE SE NW Section 34-27-2w, western Kay County, was dry and abandoned at 1,055 ft.

New wildcat and outpost tests included: Senora Oil & Gas Co.'s No. 1-A Standridge, SW SE NW Section 26-5-4, west edge of Bebee pool, Pontotoc County, drilling below 1,205 ft.; W. B. Davis and others' No. 1 Thlocco, NW SW NW Section 30-7-7, east of Little River pool, Seminole County, location; Loual Drilling Co.'s No. 1 Jackson, C SW NE Section 24-9-9, about 3 miles west of South Wetumka pool, drilling below 1,710 ft.; J. O. Hayes Drilling Co. and others' No. 1 McKernan, C E½ SE NW Section 25-12-8, about 3 miles north of the Dill pool, Okfuskee County, location; Elson's No. 1 Murphy, SE SE NW Section 20-19-2e, about 5 miles north of the Ramsey pool, Payne County, location; Gulf Oil Corp.'s No. 1 Qualls, C SW NE Section 23-1n-7w, about 3 miles northeast of Duncan, Stephens County, moving in rotary tools for an 8,500-ft. test.

Oklahoma County

The largest of three producers completed in the Oklahoma City field was British American Oil Producing Co.'s No. 2 Military, NE NE SW Section 34-12-3w. It had Wilcox sand at 6,412 ft., total depth 6,548 ft., 8-in. pipe set at 6,386 ft., shot at 6,462-6,540 ft., pumped 962 bbl. of oil in 24 hours.

Indian Territory Illuminating Oil Co.'s No. 6 Wisel, NW SW SE Section 26-11-3w, had Wilcox sand at 6,535 ft., total depth 6,617 ft., was shot at 6,569-6,617 ft., pumping 272 bbl. of 40-gravity oil in 24 hours. Same company's No. 13 Emerson, NE NW SW Section 30-11-2w, topped lower Hoover sand at 4,074 ft., total depth 4,094 ft., shot at 4,076-92 ft., and pumped 233 bbl. of 40-gravity oil daily.

Pottawatomie County

G. & M. Co.'s No. 1 Rodgers, SE SW SW Section 31-11-4, Shawnee pool, Pottawatomie County, found Earlsboro sand at 4,481 ft., was bottomed at 4,500 ft., 7-in. casing set at 4,478 ft., was shot and flowed 345 bbl. of oil daily. Ray Dunnett's No. 5 McDonald, SE NW SE Section 31-11-4, was shot and flowed 268 bbl. of oil daily from Earlsboro sand at 4,424-55 ft., total depth.

Stanolind Oil & Gas Co.'s No. 1 Washington, SE NW NE Section 24-11-4, North Shawnee area, was dry and abandoned in Wilcox sand at 4,910-28 ft., total depth.

Magnolia Petroleum Co.'s No. 4-D Fyke, NE NE NW Section 29-7-5, St. Louis district, topped Cromwell sand at 3,160 ft., total depth 3,183 ft., set 7-in. casing at 3,160 ft., was shot and pumped 55 bbl. of oil daily. Burns' No. 1-A Bickford, SW SE NE Section 30-7-4, was dry and abandoned in Wilcox sand at 4,492-4,533 ft. Same operator's No. 1 Davis, SE SW NE Section 30-7-4, had dolomite at 4,240 ft., total depth 4,300 ft., perforated casing and acidized without result and was abandoned.

Mid-Continent Petroleum Corp.'s No. 7 Rogers, SW NE SW Section 5-9-5, Earlsboro area, had first Wilcox sand at 4,308 ft., second sand 4,405 ft., total depth 4,416 ft., set 7-in. pipe at 4,397 ft., and pumped 10 bbl. of oil and 80 bbl. of water daily.

Seminole County

Rudco Oil Co.'s No. 8 Tewee, SE NW NE Section 14-7-6, Little River area, Seminole County, had Cromwell sand at 3,152-70 ft., total depth, set 7-in. casing on top of sand and flowed 226 bbl. of oil daily. Magnolia Petroleum Co.'s No. 4-B Harjo, SW NE NE Section 14-7-6, set 7-in. casing on top of Cromwell sand at 3,160 ft., total depth 3,183 ft., was shot and pumped 55 bbl. of oil in 24 hours.

Traugh's No. 3 Dotson, SE SE SE Section 22-6-6, Traugh pool, had sand at 2,349 ft., total depth 2,360 ft., plugged back to 2,358 ft. and was dry and abandoned.

Southwestern Oklahoma

Rock Creek Oil Co.'s No. 1-B Pierson, NE SE SE Section 35-6-10w, Cement field, Caddo County, set 5-in. casing on bottom at 3,388 ft., perforated at 3,264-80 ft. and 3,350-60 ft., and pumped 75 bbl. of oil daily.

Central's No. 1-B Hefner, NE NW SW Section 12-1n-5w, Doyle pool, Stephens County, topped sand at 5,490 ft., oil pay 5,595 ft., total depth 5,912 ft., set 7-in. casing at 5,909 ft., perforated and shot, flowing 140 bbl. of oil daily by heads.

McAlester's No. 4-B Wade, NW SW NE Section 11-2s-8w, was bottomed at 2,101 ft., lost hole after bailing 4 bbl. of oil in 2½ hours, and was abandoned.

Pawnee-Osage Counties

Hyden's No. 1 Mills, SE NE SW Section 20-20-10, southeastern Pawnee County, had Red Fork sand at 1,866-1,904 ft., total depth, was shot at 1,875-1,902 ft., and pumped 25 bbl. of oil daily.

Magnolia Petroleum Co.'s No. 4 Betts, NW SE SW Section 14-26-6, South Burbank area, Osage County, topped Bartlesville sand at 2,832 ft., total depth 2,911 ft., shot at 2,850-2,907 ft., and flowed 271 bbl. of oil through tubing in 12 hours. Peters and others' No. 2 Osage, NE NE SW Section 4-23-10, was dry and abandoned at 2,509 ft. Millard and others' No. 1-A Osage, SW SW NE Section 3-28-11, was dry and abandoned at 958 ft.

Creek-Okfuskee Counties

Burke-Greis Oil Co.'s No. 4 Robinson, NE NE SW Section 36-11-9, Okemah area, Okfuskee County, pumped 75 bbl. of oil and 15 bbl. of water after a shot in Wilcox sand topped at 3,765 ft., total depth 3,839 ft. Walker's No. 2 Klein, C SW NW Section 2-11-11, Fields area, had a hole full of water in Wilcox sand at 3,652-71 ft., total depth, and was abandoned.

Shamblin's No. 3 Roller, SE NE NE Section 13-17-10, Kellyville area, Creek County, was shot in Red Fork sand topped at 1,866 ft., total depth 1,896 ft., and pumped 25 bbl. of oil daily. J. E. Crosbie, Inc.'s No. 3 Mosquito, NE NW NE Section 20-17-9, had a hole full of water in Bartlesville sand at 2,542-2,646 ft., and was abandoned. Strozier Drilling Co.'s No. 10 Bieriy, C N½ N½ NW SW Section 12-16-11, Mounds area, pumped 25 bbl. of oil daily at 1,790 ft., total depth.

Wells' No. 4 Scott, SE NW NE Section 25-10-11, Weleetka district, Okfuskee County, was shot and pumped 25 bbl. of oil daily from sand at 2,036 ft., total depth 2,065 ft.

Miscellaneous Completions

Midco Oil Corp.'s No. 1 Harbison, NW SE SW Section 22-23-2w, Billings pool, Noble County, found Wilcox sand at 4,331-47 ft., total depth, set 7-in. casing at 4,322 ft., and flowed 342 bbl. of oil through tubing in 4 hours.

Okmulgee County: Earl Lins' No. 1-A Scripture, C E½ E½ NW NW Section 1-13-12, pumped 8 bbl. of oil at 1,701 ft., total depth. M. Kirkland's No. 3 Green, CNL SE NE Section 24-15-12, was good for 20 bbl. of oil daily at 1,649 ft., total depth.

Cook and others' No. 4-A Horner, SE NE SE SE Section 14-17-12, Tulsa County, pumped 30 bbl. of oil daily at 1,395 ft., total depth.

Musselem's No. 5 Flusche, CEL SE NE Section 17-14-17, Beland area, Muskogee County, total depth 1,896 ft., pumped 72 bbl. of oil daily.

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Among the Drilling

HENRY SCHOOLER, contractor of Big Lake, Tex., is drilling a recently staked wildcat test in Reagan County, West Texas. It is being drilled for R. E. Ringo of Los Angeles on the California man's large ranch 6 miles west of Stiles. To be known as Ringo's No. 1 Ringo, the test is located 1,320 ft. from the north and west lines of Section 22, Block K, about 1½ miles north of the old Centralia stagecoach station.

BYARS DRILLING CO., Tyler, Tex., has received contract and is moving in materials for a scheduled 7,500-ft. wildcat test southeast of Henderson in Rusk County, eastern Texas. It will be drilled for J. S. Harold of Tyler who recently completed the block and arrangements for the deep test. In the Marie Carmel Survey, the test will be No. 1 M. J. Armstrong, about 3 miles southeast of Henderson. Derrick is being erected for immediate spudding. The location is about a mile south of an old failure recently taken over by Harold to deepen.

GEORGE CALLIHAN, drilling contractor and independent operator of Albany, Tex., was last week engaged in loading a large spudder on flat cars for shipment to Cuba. The contractor has signed agreement for a 3,000-ft. wildcat test about 40 miles from Havana. Being drilled for a New York oil man, the machinery for the test is to be shipped to Texas City by rail where it will be loaded onto a boat for shipment to the island. Mr. and Mrs. Callihan will leave this week for Cuba, and will direct the operations incident to moving in and setting up, and will supervise the drilling and testing of the well.

J. I. ROBERTS is attempting to open a new field in South Texas with the completion of Skelly Oil Co.'s No. 1 State offshore from Kleberg County in Laguna Madre Bay. The well was drilled to a total depth of 9,429 ft., and on a 24-hour drill-stem test through perforated casing at 7,459-60 ft., the well flowed 120 bbl. of fluid and 3,500,000 cu. ft. of gas per day through ¼-in. choke.

CHRISTIAN-CARPENTIER Drilling Co. established distillate production in the Ogburn area, Harris County, Texas, with the completion of Joyce Richardson's No. 1 Marks, which is flowing an unestimated amount of gas and distillate through perforated casing at 6,918-26 ft. Another operation is reported in the Cypress area, Harris County, where the company's No. 1 Anderson is coring in shale below 6,800 ft.

AL BUCHANAN Drilling Co. has reached an interesting depth in Shell Oil Co.'s No. 1 Goodrich, an outpost well located in the newly opened Sheridan field, Colorado County, Texas.

HARRY L. EDWARDS Drilling Co. is moving a rig to the New Iberia field, Iberia Parish, coastal Louisiana, for Midstates Oil Co.'s No. 1 Schwing. In the Dickinson and Bay City fields production strings were cemented in two wells for the Pan American Production Co. and Midstates Oil Co., while three other rotaries are running at the Anse La Butte and Old Ocean fields for Stanolind Oil & Gas Co., Fidelity Oil & Royalty Co. and Harrison & Abercrombie.

CONROE Drilling Co. is moving a rig to the east flank of the Stratton field, Nueces County, Texas, for the company's No. 1 W. S. Sellers, a north offset to Southern Minerals Corp.'s No. 1 Bertram, completed the past week to open the first oil production in the field.

ALLEN & MORRIS are rigging up for a new test in the La Rosa field, Refugio County, Texas, for Coronado Corp., and are making a production test of the same company's No. 1 J. J. Welder, a prospective pool opener in Calhoun County. Another producer was completed in Nueces Bay offshore from the East White Point field for Sinclair Prairie Oil Co., while two producers were completed in the same area for W. R. R. Oil Co.

McDANNALD Oil Co. marked up an important extension to the Old Ocean field, Brazoria County, Texas, with the completion of Stanolind Oil & Gas Co.'s No. 1 Stevenson-Donovan. The well is about 4,200 ft. east of production and is flowing from perforated casing at 10,060-72 ft., and at 10,085-10,112 ft. Another rig is running in the field for the same company, while three other operations are reported at Tomball, Dickinson and Magnet fields for Standard Oil Co. of Kansas, Pure Oil Co., and McDannald Oil Co.

NICKLOS Drilling Co. opened a field on the Ritchie prospect, Acadia Parish, coastal Louisiana, with the completion of No. 1 McMannus. The well was drilled jointly with Vincent & Welch, and was completed at a

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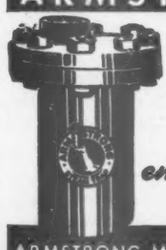

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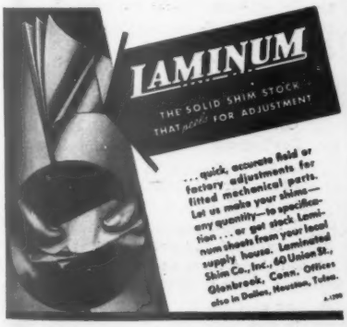
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total depth of 3,537 ft. for an estimated initial production of 15 bbl. of 28-gravity oil and 2,000,000 cu. ft. of gas per day flowing through ¾-in. choke. Tubing pressure was 750 lb., and casing pressure 850 lb. In the Erath field, Vermilion Parish, Strake Petroleum Co.'s No. 1 Caldwell, an important north outpost well, is coring in shale below 11,415 ft., while in the Wax Bayou field, drilling was started on Texas Co.'s No. 5 Wax Bayou.

RED IRON Drilling Co., Shreveport, La., is spudding in on W. C. Feazel's No. 1 Tillman, a 6,500-ft. test farmed out by Standard Oil Co. of Louisiana, 1 mile south of gas production in the Dubberly area of Webster Parish, North Louisiana. Another Red Iron rig recently completed Sells Petroleum Co.'s No. 1 Faulkner, a deep wildcat in Yazoo County, Mississippi, and a cable-tool rig is testing possible oil-producing horizons in G. C. Grasty's No. 1 Kentucky Lumber Co. wildcat in Itawamba County, Northeast Mississippi.

PARKER Drilling Co. of Tulsa is moving material into Exchange Oil Co.'s No. 1 Bennett, a wildcat located about 3 miles west of the Pickens field of Yazoo County, Mississippi.

DELTA Drilling Co., Shreveport, La., has contract for Shell Oil Co., Inc.'s deep No. 1 Wall in Bowie County, East Texas. Other Delta rigs are drilling in Gibson County, Illinois, and in the Slaughter pool of Hockley County, Texas, where Delta is drilling a company test.

M. J. DELANEY CO. of Dallas, Tex., has contracted to drill Exchange Oil Co.'s No. 4 Wilburn, a west-edge test in the newly discovered Pickens field of Yazoo County, Mississippi.

HANNUM Drilling Co., Wichita, Kans., has contracted to drill an offset to the discovery well in the Bitikofer pool, eastern McPherson County, Kansas, for Saco Oil Co. and Aladdin Petroleum Corp. Location is in Section 36-19-1w. Contractors were to move in rotary tools from another well nearing completion.

V. B. LIKENS, president of the Osage Drilling Co., at No. 1-B Tippett, in Section 266, Block G, of W.T. Survey, ¼ mile north and ½ mile west of the north extension to the Seminole pool of Gaines County, Texas, drilled to 5,236 ft., and acidized with 5,000 gal., got a potential of 469 bbl. a day.

E. J. SHAFFER, drilling contractor of Hutchinson, Kans., has contracted to drill No. 1 Holt, SW SW Section 35-2n-16e, wildcat northeast of Falls City, Neb., for Ed Jackson of Atchison and C. L. Carlock of Wichita. Rotary tools will be used.

Crew on Rowe Brothers, Inc.'s (drilling contractor of Wichita Falls, Tex.) rig drilling in the Hull-Silk field of Archer County, North Texas; Moss Rowe, driller; P. C. Bumpers, backup man; R. B. Andress, pipe racker; E. B. Cunningham, derrick man

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Rocky Mountain Area

By

T. R. INGRAM

Moffat County, Colo., Well Produces From Three Sands

DENVER, Colo., June 24.—The staking of two wildcat tests in the district held the attention as the week closed in southeastern New Mexico. Torrance County, in the central part of the state, was given a wildcat operation; the other was in Eddy County.

The new Torrance County wildcat is J. P. Stewart's No. 1 Harry Lammons, 650 ft. from the north and 1,700 ft. from the east lines of Section 3-3-12. At last reports spudder was being moved to location.

Eddy County's new operation was about 4 miles southeast of Lake McMillan and is Bedingfield & Walker's No. 1 Seale. The location falls in the SE SE Section 10-20-27.

Eddy County

Sanders Bros.' No. 1 De Temple, NW NW Sec. 27-19-31. S.D.O. 2,410 ft.

Bassett & Birney's No. 1 Platt, SW cor. Sec. 26-18-26. Old failure being D.D. below 2,342 ft.; P.B. 1,125 ft.; shot 160 qt., 1,080-1,122 ft., S.S.O.; reshot 470 qt.

Max Weathers' No. 1 Flood, SE SE Sec. 24-18-23. S.D.O. 1,740 ft.

M. Yates, Jr.'s No. 1 McCall, SW SW Sec. 24-18-26. R.U. spdr. 873 ft.

Jack Harris' No. 1 Josey, SW SE Sec. 19-20-23. S.D.R. 286 ft.

Schumacker's No. 1 Levers, NE NE Sec. 33-16-29. Drlg. 1,912 ft.

J. B. Mulcock's No. 1 Etz, 660 ft. from S and W lines, Sec. 25-16-30. S.D.R. 2,530 ft.

Everts & Moran's No. 1 Ranux, NE NW Sec. 18-23-26. T.D. 1,373 ft.; U.R.

J. B. Cowden's No. 1 State, SW SE Sec. 3-17-20, between Root field and High Lonesome field. R.U. mach.

G. A. Grober's No. 1 Wright, 1,080 ft. from N and W lines, Sec. 25-18-28. S.O.&G. 1,382 ft.; est. 10 B.O.P. D.; W.O.C. 2,398 ft.

Bedingfield & Walker's No. 1 Seale, SE SE Sec. 10-20-27. Loc.

G. M. Cone's No. 1 Hare, NW NW NE Sec. 14-16-28, 3 mi. W of High Lonesome field. S.D.R. 1,400 ft.

Artesia Drlg. Co.'s No. 1 Hoffman, SE SE SE Sec. 14-17-24. Est. 1,250,000 cu. ft. at 938 ft.; rig. 1,195 ft.

Frederick's No. 1 Reed, 1,980 ft. from S and W lines, Sec. 28-24-28. O.W.D.D.; top gas sand 2,891 ft.; est. 2,000,000 cu. ft. gas; casing set at 2,873 ft. and collapsed at 2,200 ft.; rectmd. csg.; W.O.C.

Wilder's No. 1 Young, 1,650 ft. from N and W lines, Sec. 23-16-29. S.G. 1,805 ft.; W.O. mch. 3,095 ft.

Thomas & Bowers' No. 1 H. W. Etz, 2,310 ft. from N and 330 ft. from W lines, Sec. 12-16-30. T.D. 3,744 ft.; P.B. 3,200 ft.; C.O. after shot from 3,140-60 ft.; before shot made 10 B.O.P.D.; flowing by heads through casing. T.D. 3,744 ft.

Dona Ana County

Picacho O. & G. Co.'s No. 12 Armstrong, Sec. 15-23s-1w. W.O.C. 2,660 ft.

Slack & Mahres' No. 1 Simmons, Sec. 35-22s-5e. Setting whipstock at 2,785 ft.; T.D.

Luna County

O. D. Berry's No. 2 Berry, Sec. 33-22-10. T. D. 925 ft.; S.D.O.

Lea County

Gulf Oil Corp.'s No. 1 Amanda E. Drinkard, NW SE Sec. 25-22-37, in Skelly area; 5,000-ft. test. S.S.G. 3,794-3,804 ft.; made 5 gal. oil hourly; T.D. 3,958 ft.; prep. P.B. 3,545 ft.; test.

J. D. Barefield's No. 2 stroup, 1,980 ft. from N and E lines, Sec. 12-18-32. S.D.O. 4,055 ft.; S.S.O. 4,040-50 ft.; 1 bailer oil after 2-day shut-in; rng. electrical survey at 4,100 ft., S.S.O.&G.

Stogner & Weiner's No. 1 State, SE SE Sec. 30-12-32. T.D. 1,373 ft.; P.B. 1,193 ft.; drlg. out bridge.

Stanley & Weiner's No. 1 Saunders, NE NE Sec. 20-21-38. Spd. and S.D.

Otero County

Ernest's No. 1 Ernest, Sec. 20-25-7. S.D.O. 3,204 ft.; S. S.G. 3,180 ft.

Otero Oil Co.'s No. 1 State, SE NW Sec. 5-22-10. S.D.O. 825 ft.

Socorro County

Joiner Oil Corp.'s No. 1 Belen grant, 2,310 ft. N and W lines, Sec. 16-3-1. S.D.O. 845 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Eddy County

Wildcats, Sam Montgomery's No. 1 Kaltenbach, NW NW NW Section 24-16-27, abandoned but not plugged at total depth of 2,243 ft. Evarts Drilling Co.'s No. 1 Greer, SE cor. Section 31-16-31, plugged and abandoned at total depth of 3,854 ft.

High Lonesome field: J. H. Sikes' No. 1 Iles, NE NW Section 20-16-29, made 10 bbl. daily, pumping after shot in pay from 1,776-1,820 ft.

Loco Hills: Sallee & Yates' No. 3 State, SE NE Section 2-18-29, made 144 bbl. in 4 hours, flowing through 1-in. choke on tubing after shot in pay from 2,651-71 ft. Continental Oil Co.'s No. 3 Brainard, SE NE Section 3-18-29, made 30 bbl. in 3 hours, flowing through ¾-in. choke after shot in pay from 2,626-56 ft. Suppes & Suppes' No. 2 Miller, NE NE Section 6-18-29, made 33 bbl. daily, flowing through open tubing after shot in pay from 2,670-2,715 ft.

Lea County

Maljamar field: Maljamar Oil & Gas Co.'s No. 2-B Baish, SE SW Section 22-17-32, made 135 bbl. in 11 hours, flowing through open tubing, naturally, from pay at 3,955-78 ft.

Vacuum field: Magnolia Petroleum Co.'s No. 64 State-Bridges, SW NE Section 14-17-34, made 401 bbl. daily, flowing through ½-in. choke after shot in pay from 4,634-64 ft. Shell Oil Co., Inc.'s No. 4-T State, SE SE Section 33-17-35, made 140 bbl. daily, flowing through 8/64-in. choke after acid in pay from 4,430-4,625 ft.

Arrowhead field: Gulf Oil Corp.'s No. 6 Ramsey, SE NE Section 35-21-36, made 300 bbl. in 6 hours with 1,217,000 cu. ft. gas, flowing naturally, through open tubing from pay at 3,760-3,850 ft. Continental Oil Co.'s No. 5-B-1 Lockhart, SW SE Section 1-22-36, made 35 bbl. in 14 hours flowing through ¾-in. choke after acid in pay from 3,715-59 ft. Ohio Oil Co.'s No. 19 State-McDonald, NE SE Section 13-22-36, made 106 bbl. in 12 hours, flowing naturally, through 12/64-in. choke from pay at 3,720-57 ft.

NORTHWEST NEW MEXICO

Rio Arriba County

Lafayette M. Hughes-Continental Oil Co.'s No. 1 Jacarilla-Apache, CSL SE NE Sec. 22-31n-1w. Drlg. 503 ft.; prep. to run 10-in.

San Juan County

Continental Oil Co.'s No. 107 Rattlesnake, C E½ NW Sec. 13-29n-19w. M.I.M. (first report).

COLORADO

Moffat County

Mountain Fuel Supply Co.'s No. 5-A Wilson, in the Hiawatha field, swabbed 600 to 650 bbl. per day from the first sand at 2,005-2,125 ft. through perforated casing. This is the big gas sand in No. 1 Kuykendall, drilled immediately to the west in 1935 which was completed for 37,000,000 cu. ft. per day and which was afterwards deepened and made into an oil well. No. 5-A Wilson showed for about 240 bbl. per day in the second sand and 160 bbl. in the third sand. Plugs between sands are being drilled for an official test of all three horizons.

WYOMING

In Lance Creek Ohio Oil Co.'s No. 15 Carrie Putnam, NW NE SW Section 33-36n-65w, was completed at 5,481 ft. after plugging back from 5,541 ft. to shut off bottom water in the Leo sand. It made 472 bbl. in 24 hours from the upper Leo. The 7-in. casing was cemented at 5,351 ft.

Ohio Oil Co.'s No. 14 Elizabeth Lamb, Account 2, C SW SE Section 5-35n-65w, was completed at 5,445 ft. and made 831 bbl. in 24 hours from the Leo sand through perforated casing. It was perforated with 37 holes between 5,395 and 5,413 ft. and 40 holes between 5,368 and 5,385 ft.

Sublette County

In La Barge field North La Barge Oil Co.'s No. 3 Government, SE SE NE Section 28-27n-113w, was completed in the second sand at 1,072 ft., total depth, and pumped at the rate of 185 bbl. per day.

Weston County

George Keisling's No. 2 Lundberg, CWL NE SE Section 35-46n-64w, Osage field, was completed in sand at 1,979-96 ft. and swabbed 60 bbl. per day after a shot with 40 qt.

H. D. Wiltse's No. 12, NW NW NE Section 17-46n-63w, was dry to 495 ft. It was plugged and abandoned.

MONTANA

Carbon County

R. C. Tarrant's No. 2 McKay, C SE NW Sec. 4-6s-18e. Drlg. 3,005 ft.

Fergus County

C. E. Emmons and others' No. 3 Government, CWL NW NW Section 5-21n-18e, Winifred district, was drilled to 485 ft. and plugged back to 450 ft. and completed for 200,000 cu. ft. of gas per day in the Eagle sand.

Tony Co.'s No. 1, CNL NE SW Sec. 36-22n-17e. Drlg. 105 ft. (first report).

E. & M. Oil & Gas Co.'s No. 4, SW SE SW Sec. 34-33n-18e. Drlg 305 ft. (first report).

Glacier County

In the Cut Bank field A. B. Cobb's No. 6 Wahlberger, SE SW SE Section 33-35n-6w, was completed at 2,814 ft., total depth, and swabbed and flowed 45 bbl. first 12 hours from the Cut Bank sand at 2,753-2,812 ft. Main pay was at 2,795-2,812 ft. and 7-in. casing was set at 2,760 ft.

Consolidated Gas Co.'s No. 3 State, SE NW SE Section 26-35n-6w, swabbed 115 bbl. first 24 hours at 2,814 ft., total depth, from the Cut Bank sand at 2,740-2,814 ft. Main pay was at 2,800-14 ft. and 7-in. casing was set at 2,773 ft.

Annand-Hutchings' No. 5 Federal Land Bank, CSL N½ SW Section 11-34n-6w, was drilled to 2,908 ft. and 8⅝-in. casing was set at 2,882 ft. The Cut Bank sand was at 2,868-95 ft. with the upper sand dry and 165 ft. of oil from the lower sand at 2,895-2,905 ft. It swabbed 15 bbl. first 24 hours and then was shot with 40 qt. and is cleaning out.

Castle-Pardee's No. 2 Tarrant-Corrigeux, SE NE NE Section 2-33n-6w, had only 75 ft. of oil in the hole at 2,990 ft., total depth, from shows in the Cut Bank sand and failed to improve after being shot with 100 qt. at 2,961-85 ft. It was plugged and abandoned.

Santa Rita Oil & Gas Co.'s No. 6 Whetstone, C Lot 2, Section 27-35n-6w, had the Sunburst and upper Cut Bank at 2,800-95 ft. without any break between them. There was no lower Cut Bank. It was plugged and abandoned at 2,925 ft., total depth.

Hill County

Wm. Hanlon's No. 1 Govt., C SW NE Sec. 19-37n-15e. Spd. and S.D.

Adams-Hesla Oil Co.'s No. 2 McManus, C SE SE Section 21-35n-2w, Kevin-Sunburst field, pumped 25 bbl. of oil and 7 bbl. of water per day from the Sunburst sand at 1,440-45 ft., after acidizing with 1,000 gal.

Imperial-Craig Co.'s No. 2 Gause, C SE NW Section 18-35n-1w, failed to obtain results after acidizing with 750 gal. and was plugged and abandoned at 1,702 ft., total depth. It had the contact at 1,527-32 ft.

Coolidge & Coolidge's No. 7-A, NW SW NW Section 36-36n-2w, lost the hole at 1,535 ft., total depth, while trying to complete in the Sunburst. It was plugged and abandoned and rig skidded 100 ft. north for No. 7-A-2 State.

UTAH

Box Elder County

Utah Duchess Oil Co.'s No. 1, NW cor. Sec. 26-14n-8w. Drlg. 400 ft.

Daggett County

Mountain Fuel Supply Co.'s No. 5 Murphy, SW NE SW Sec. 15-3n-24e. Loc. (first report).

Mountain Fuel Supply Co.'s No. 1 Govt., SE NE NE Sec. 19-3n-24e. Drlg. 5,865 ft.

Grand County

Reeder Corp.'s No. 1 State, NE NE NE Sec. 16-22s-19e T.D. 1,060 ft.; fsg.

California Field Report

By L. P. STOCKMAN

Prospective Pool in Midway-Sunset Area in Kern County

LOS ANGELES, Calif., June 24.—Republic Petroleum Co. found a new shallow accumulation in the Midway section of the Midway-Sunset field of Kern County last week when No. 1 C.H. in Section 18-32-23, was completed pumping 150 bbl. of 16.4-gravity oil cutting 3 per cent daily from 1,900 ft. It logged 50 ft. of oil sand at 1,850-1,900 ft., total depth 2,466 ft., plugged back to 1,900 ft. Production is coming from probably the Santa Margarita formation of upper Miocene age which has proved quite prolific in the Mountain View field and other similar fields.

Wilmington

In the Wilmington field of Los Angeles Basin Long Beach Oil Development Co. finished No. 13-W flowing 761 bbl. daily from 4,072 ft. and No. 14-W flowing 410 bbl. per day from a depth of 4,006 ft. From the Ranger zone No. 13-W produced 300 bbl. of 17.2-gravity oil through a 13/64-in. bean, from the upper Terminal zone, 195 bbl. of 26.3-gravity oil, and from the lower Terminal zone 266 bbl. of 28.2-gravity oil initially through a 15/64-in. bean. Sanger zone was logged at 2,560-2,861 ft., upper Terminal at 3,058-3,381 ft., and lower Terminal at 3,526-4,067 ft. No. 14-W was also a multiple zone completion but only the lower Terminal zone was produced. The hole was finished with 3,346 ft. of 5½-in. flow string with a packer at 2,963 ft. and 3,963 ft. of 2½-in. tubing with a packer at 3,362 ft. Union Pacific Railroad Co. completed No. 145 Offset flowing 885 bbl. of very clean 24.5-gravity oil daily from the upper and lower Terminal zones with bottom of the hole at 3,825 ft. No. 17 Harbor of E. D. Power was completed in the Ranger zone pumping 180 bbl. of 14.4-gravity oil daily from 3,470 ft.

Huntington Beach

Southwest Exploration Co. in the Huntington Beach tidelands completed No. 29 State at Twenty-third Street and Ocean Avenue, whipstocked out beneath the Pacific Ocean. It pumped 351 bbl. of 23.2-gravity oil per day from 4,535 ft. This new well is producing from 855 ft. of formation and was finished with an 8⅝-in. water string cemented at 3,680 ft. and 866 ft. of 6⅝-in. liner which was perforated at 3,693-4,535 ft. Standard Oil Co. completed No. 41 Bolsa lease on which the Huntington Beach discovery well was located and it flowed 137 bbl. of 25.9-gravity oil cutting 50 per cent daily from 2,950 ft. Due to the large cut the company may do some corrective work.

The city of Huntington Beach by action of the city council and Mayor McCallen has decided to institute legal proceedings to determine who owns the Huntington Beach tidelands which for the past several years have been claimed by the State of California and placed under jurisdiction of the state Department of Natural Resources and the city of Huntington Beach with the federal Government attempting to move in on both the city and state and take possession of all tidelands. The proceedings will cover tidelands adjacent to the uplands claimed by Standard Oil Co. and others. The Pacific Electric Co., which operates an interurban electric train between Los Angeles and Huntington Beach, is also interested because its tracks parallel Standard's holdings immediately adjacent to the tide line. The Huntington Beach Co. has also asserted claims to Huntington Beach tidelands and thus this company, purchased several years ago by Standard Oil Co., may also be named a defendant.

Coalinga

Pure Oil Co., which entered California several years ago, is expected to secure its first oil well within the next 15 days as its No. 1 Schwinn in Section 30-19-16, midway between the Northeast and Southeast Coalinga fields indicated a large flow of oil and gas on a formation test at 8,104-88 ft. With the tester open 5 hours and 30 minutes and with a 1,000-ft. water cushion the well flowed at the rate of 2,500 bbl. of very clean 26.4-gravity oil daily. No estimate of gas production was made but it was in excess of 2,000,000 cu. ft. No. 1 Schwinn was bottomed at 8,230 ft. when the formation test was made and the company immediately started preparations to drill ahead to determine how much oil sand was present and whether any additional oil sand might be found below that already tested. Pure Oil Co. has drilled several wildcats in California during the past 5 years but this is the first well that showed anything resembling large production of crude oil.

As soon as Pure completes No. 1 Schwinn, Petrol Corp. will begin drilling operations north of it on a 20-acre parcel. George F. Getty, Inc., and Pacific Western Oil Co. are making plans to drill an outpost south of No. 1 Schwinn after completion of Pure's potential producer. In the same section as No. 1 Schwinn, Bandini Petroleum Co. is in the pay with No. 71-30-B at 8,243 ft. and is making preparations for an early production test. This well which topped the Kreyenhagen at 7,036 ft., top of the glauconitic at 8,118 ft., top of the grit zone at 8,156 ft. and top of the productive Gatchell zone at 8,199 ft., has a 7-in. water string cemented at 8,182 ft. South of the Southeast Coalinga field, Universal Consolidated Oil Co. is in the pay at 7,816 ft. in No. 3 Binkley in Section 24-20-15. No. 3 Binkley, otherwise designated as No. 72-24-C in conformity with the numbering system in effect in this field, is the third well to find the pay on this 87-acre lease.

Cole's Levee—Tupman

Richfield Oil Corp., which is running 14 strings of tools in the Cole's Levee-Tupman field of Kern County and which has derricks standing or locations staked for 10 additional wells, completed No. 276-29-A Kern County Land in the Tupman part of the field flowing 1,550 bbl. of clean 33.3-gravity oil and 2,300,000 cu. ft. of gas per day from the productive Stevens sand through a 13/64-in. bean from 9,125 ft. This new well which was drilled for Richfield Oil Corp. by J. E. Mabee, Tulsa drilling contractor, was finished with an 8⅝-in. water string cemented at 8,498 ft. and 678 ft. of 6⅝-in. liner including perforations opposite the oil sand at 8,533-8,617 ft., 8,659-8,819 ft. and 8,969-9,113 ft. Production is flowing through 9,078 ft. of 2½-in. tubing. Richfield Oil Corp. has 11 incompleted drilling wells making hole in this field below 8,000 ft. and therefore should complete at least 10 of them during the next 30 days. Standard Oil Co. and Ohio Oil Co. also have wells drilling ahead below 8,000 ft. and each should finish one new well within the next few weeks.

San Joaquin Basin

No. 10-1 fee of Beiridge Oil Co. in the North Beiridge field of Kern County was completed but it turned out to be a gas well with the result that oil production was very small. Initial daily production was gaged at 187 bbl. of clean 52.4-gravity oil and 35,100,000 cu. ft. of gas per day from the Wagonwheel zone of Eocene age at 8,250 ft. This new well, which is located in Section 1-28-20, and has an elevation of 311 ft. above sea level, found the "A" marker at 5,092 ft., the "R" marker at 7,592 ft., the "T" marker at 7,762 ft., the "U" marker at 7,793 ft. and the top of the Wagonwheel at 7,955 ft. Due to its extremely high gas-oil ratio the well was shut in.

Coastal Area

Petrol Corp. completed another good well on the Tognazzini property in Section 15-8-32, in the Gato Ridge field of Santa Barbara County when No. 3-15 was finished flowing 2,250 bbl. of 14.9-gravity oil per day from 2,900 ft. The Gato Ridge field which was discovered by Barnsdall Oil Co. several years ago has only produced a limited amount of crude oil up to date due to lack of adequate pipe-line facilities and not too strong a demand for this type of oil. Wells usually come in with good initials and hold up satisfactorily.

Tide Water Associated Oil Co. completed No. 17 McGonigle in the Ventura Avenue field of Ventura County flowing 1,348 bbl. of 28.9-gravity oil cutting 5 per cent and 1,215,000 cu. ft. of gas per day from the deep zone with bottom of the hole at 10,050 ft. General Petroleum Corp. is rigging up No. 19 Barnard.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	June 16		June 9			
Intercoastal-domestic—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Crude oil	.....	.....	60,731	8,689	204,948	247,520
Fuel oil	.....	.....	.....	.....	188,938	1,017,906
Diesel and gas oil	.....	.....	.....	.....	.....	163,501
Gasoline	200,665	6,689	.....	.....	1,484,743	1,493,684
Kerosene	.....	.....	.....	.....	.....	122,200
Foreign exports—						
Crude oil	152,408	21,773	152,069	21,724	6,308,962	7,139,072
Fuel oil	113,479	16,211	335,126	47,875	3,834,124	4,231,455
Diesel and gas oil	97,753	13,965	191,166	27,309	3,022,068	2,998,784
Gasoline	40,425	5,775	47,717	6,817	2,197,782	3,577,203
Kerosene	30,512	4,359	5,418	774	579,810	773,750
Lubricants	.....	.....	.....	.....	79,134	42,034
Coastwise-domestic—						
Crude oil	406,837	58,120	55,142	7,878	4,619,643	5,691,943
Fuel oil	108,227	15,461	376,687	53,812	7,249,497	4,241,674
Diesel and gas oil	54,770	7,824	60,740	8,677	1,335,540	1,140,029
Gasoline	377,795	53,971	377,155	53,879	7,588,561	6,788,415
Kerosene	.....	.....	26,720	3,817	270,811	177,653

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Fuel oil	.....	.....	.....	.....	67,840	124,055
Diesel and gas oil	.....	.....	.....	.....	281,260	69,550
Asphalt	74,900	10,700	.....	.....	315,788	280,447
Lubricants	.....	.....	.....	.....	11,151	14,182
Foreign exports—						
Crude oil	168,831	24,119	.....	.....	1,767,788	2,589,972
Fuel oil	82,385	11,769	.....	.....	960,003	1,476,160
Diesel and gas oil	121,827	17,404	.....	.....	1,332,088	1,031,360
Gasoline	54,148	7,735	.....	.....	1,137,737	1,420,772
Kerosene	35,384	5,055	.....	.....	252,452	311,799
Asphalt	.....	.....	.....	.....	.....	6,919
Lubricants	7,880	1,126	.....	.....	266,317	321,702
Other finished oil	.....	.....	.....	.....	619	352
Coastwise-domestic—						
Fuel oil	89,753	12,822	122,358	17,480	2,722,523	2,607,202
Deisel and gas oil	18,234	2,605	30,267	4,324	527,477	475,631
Gasoline	169,001	24,143	151,806	21,687	3,146,996	3,512,420
Kerosene	7,962	1,137	18,110	2,587	275,701	333,733

North Louisiana, Arkansas

By
GEORGE WEBER

Shell Starts Two Important Tests in Louisiana, Texas

SHREVEPORT, La., June 24.—Shell Oil Co., Inc.'s No. 1 Pickering Lumber Co., C NE SW Section 30-4-12, near the Texas State line in Sabine Parish, about 21 miles south of the Zwolle field and about 25 miles northwest of Leesville, is rigging up. This important wildcat, scheduled for 8,500 ft., is to be drilled on a 75,000-acre block. It will be drilled "tight" with very little information available, it is reported.

Shell has staked another deep wildcat, No. 1 W. D. Wall, in the John Downey Survey, 3 miles northwest of Maud, Bowie County, in the northeast corner of Texas. It is reported the test, with 9⅝-in. casing set at 1,006 ft. late in the week, will be drilled to the Travis Peak.

Eastern border counties in Texas are showing a marked increase in drilling activity, both in field and wildcat locations. The Smithland and Caddo shallow pools in Marion County are receiving a play, and the Waskom high-pressure gas field of Harrison County has one drilling operation, with a test staked by Union Producing Co. about 2½ miles southwest of Waskom. Other wildcat tests are progressing in Marion, Sabine and Shelby counties.

Estimated Daily Production

Estimated daily gross production all companies week ended June 22:

NORTH LOUISIANA

	Bbl.
Bellevue	480
Caddo light	5,240
Caddo heavy	2,135
Converse	545
Cotton Valley	*14,550
Cross Lake	5,025
De Soto and Red River	1,025
Elm Grove	280
Haynesville	2,650
Holly	55
Homer	2,850
Lisbon	5,070
Olla	2,085
Pleasant Hill	85
Rodessa	19,480
Sarepta-Carterville	†335
Sligo	2,040
Sugar Creek	820
Urania	2,420
Zwolle	1,725
Total North Louisiana	68,895

SOUTH ARKANSAS

Atlanta	2,740
Big Creek	65
Buckner	2,430
Champagnolle	1,145
Dorcheat	1,100
El Dorado	1,750
Fouke†	200
Lewisville	1,175
Lisbon	215
Magnolia	20,400
McKamie	80
Miller County	290
Nevada	545
Nick Springs	360
Rodessa	2,080
Schuler	18,450
Smackover light	1,755
Smackover heavy	13,725
Stephens	535
Troy	1,320
Urbana	920
Village	1,170
Total South Arkansas	72,450

*4,080 bbl. is distillate.
†55 bbl. is distillate.
Rodessa, Texas, 18,785 bbl.

Vivian Test Failure

D. T. Caubie's No. 1 Darnell, which several weeks ago caused some interest with shows of oil at 3,000 ft., has been abandoned. The well is northwest of the Vivian extension area in Caddo Parish, which several months ago saw a mild shallow-drilling boom. Perforations shot in the prospective oil horizons showed only salt water, and after shooting with nitroglycerin operators abandoned the hole at a total depth of 3,204 ft.

In south Caddo Parish J. M. Conner's No. 1-A Williams, near Spring Ridge, is down 400 ft. with surface casing set. To the east, in Bossier Parish between Bellevue and Sligo, L. K. McGuffin has a derrick up on No. 1 Tomlinson, a wildcat in Section 16-18-11. Claiborne Parish's important deep wildcat test at Haynesville, Ohio Oil Co.'s No. 15 Taylor, is below 6,170 ft. in shale, Travis Peak formation, after encountering an oil showing in the Pettit at 5,208-31 ft. and setting 9⅝-in. casing at 5,970 ft.

La Salle Activity

Oil production in the south end of Olla was extended by Placid Oil Co.'s No. 18 Louisiana Central, C SW NW Section 36-10-2e. This well gaged 142 bbl. from Wilcox pay through perforations at 2,229-34 ft. Placid Oil Co.'s No. 17 Louisiana Central, a deep 4-mile outpost to the north of the producing field, tested dry at 4,950-80 ft. during the week, and is drilling below 5,000 ft.

Arkansas Drilling

South Arkansas is quiet from the standpoint of drilling, although development of the two new discoveries may be expected. Standard Oil Co. has begun rigging up No. 2 Sturgis, a west offset to discovery well, which last week brought in the Fouke field of Miller County, producing from the Paluxy formation.

The new McKamey field, recently brought in by Atlantic Refining Co. in Lafayette County, may not see development immediately due to the gas-condensate characteristics of its production. Another Lafayette oil prospect may be opened by the J. & J. Oil Co.'s No. 1 Barnes. The test is shut down at 2,160 ft. after operators reported encountering oil shows at 767 ft., 865 ft., and 2,127 ft.

NORTH LOUISIANA COMPLETIONS

Caddo—Caddo Parish

C. J. Brown's No. 4 Muslow, Section 31-21-15, pumping 50 bbl., total depth 1,560 ft. H. B. Burden's No. 1 Fouche, Section 1-20-16, pumping 20 bbl., total depth 1,476 ft. A. L. Farr's No. 1 Muslow, Section 31-21-15, 600 bbl., total depth 1,510 ft. Claude Ferguson's No. 1 Dickson, Section 3-20-15, pumping 90 bbl., total depth 1,524 ft. Marion Oil Co.'s No. 7 Hart, Section 22-21-16, pumping 20 bbl., total depth 1,027 ft. Stanolind Oil & Gas Co.'s No. 2 Dorian, Section 18-21-15, pumping 5 bbl., total depth 1,700 ft. E. A. Stiller's No. 3 Stiles, Section 28-21-16, pumping 25 bbl., total depth 2,360 ft. L. L. Sugar's No. 1-A Sample, Section 31-21-15, pumping 50 bbl., total depth 1,595 ft.

Wildcat—Caddo Parish

D. T. Caubie's No. 1 Darnell, 1,325 ft. south, 308 ft. east, NW cor. Section 17-22-16, dry and abandoned 3,204 ft.

Olla—La Salle Parish

Placid Oil Co.'s No. 18 Louisiana Central, Section 36-10-2e, 142 bbl., 16/64-in. choke, tubing pressure 85 lb., casing pressure 590 lb., perforated 2,229-34 ft., total depth 2,423 ft.

Wildcat—Madison Parish

H. L. Hunt's No. 1 Syers Timber Co., Section 18-15-10, salt water and abandoned 3,486 ft.

Monroe—Union Parish

Interstate Natural Gas Co.'s No. 97 fee, Section 2-21-3, 1,500,000 cu. ft. gas, total depth 2,216 ft. Memphis Natural Gas Co.'s No. 2 Potts, Section 19-21-3e, 1,500,000 cu. ft. gas, rock pressure 950 lb., total depth 2,193 ft.

ARKANSAS COMPLETIONS

Atlanta—Columbia County

Tide Water Associated Oil Co. and Seaboard Oil Corp.'s No. 2 C. H. Murphy and others, Section 14-18-19, 288 bbl., ¼-in. choke, tubing pressure 600 lb., casing pressure 900 lb., total depth 8,177 ft. G. H. Vaughn's No. 1 J. N. Talley, Section 15-18-19, salt water and abandoned 8,220 ft.

Wildcat—Miller County

K. E. Jennings and J. J. Oil Corp.'s No. 1 H. T. Wood, Section 33-18-28, dry and abandoned 4,574 ft.

Smackover—Ouachita

Sam Richardson & Co., Inc.'s No. 10 J. Goodwin, Section 32-15-15, pumping 200 bbl. fluid, 75 per cent salt water, total depth 4,320 ft.

Wildcat—Sevier County

Gramp Oil Co.'s No. 1 Floyd Phillips, Section 35-9s-30w, dry and abandoned, reported show of gas at 917 ft., fresh-water sand and gravel at 1,190 ft., total depth.

Wildcat—Union County

Berg & Laney's No. 1 N. C. Cutrer, Section 21-17-14, salt water and abandoned 2,575 ft.

EAST BORDER TEXAS COMPLETIONS

Wildcat—Cass County

Joe Griffin's No. 1 W. H. Daniel, W. Pittman Survey, dry and abandoned, salt water sand 4,194-4,212 ft., total depth 4,265 ft.

Caddo—Marion County

John Coats' No. 2 Ida Burr, J. G. Reeves Survey, 30 bbl., total depth 2,392 ft. Sanders & Wycliffe's No. 1 W. P. Stiles, M. Noll Survey, dry and abandoned 2,408 ft.

Smithland—Marion County

E. D. Markham's No. 1 Sid Hart, Gaines Coore Survey, pumping 100 bbl., total depth 2,381 ft.

Ohio Fields

(Continued from Page 128)

depth 2,557 ft.; Guy Shrider's No. 2 Katie G. McKinney is a 3-bbl. pumper in the Berea, depth 527 ft.

Lorain County, Grafton Township, Forest Oil Co.'s No. 1 Harry Barth, Lot 68, Berea dry, depth 234 ft.

Four Clinton tests were dry in Spencer Township, Medina County, East Ohio Gas Co.'s No. 1 G. E. Smith, Section 15, depth 2,565 ft.; same company's No. 1 S. J. Browand, Section 10, no Clinton sand, depth 2,597 ft.; same company's No. 1 Prudential Insurance Co., Section 12, depth 2,671 ft.; same company's No. 1 R. H. Brouse, Section 6, depth 2,725 ft.

In Meigs County, Scipio Township, Nuzum Co.'s No. 2 A. M. Gilkey, Section 13, is making 3 bbl. of oil a day in the Mahoning sand at 232-38 ft., well was not shot.

In Morgan County, Penn Township, Penn Contracting Co.'s No. 1 Webster McPeak, Section 17, was deepened from 625 ft. to the second Berea for a small gas well gaging 60,000 cu. ft., depth 1,627 ft.

In Monroe County, Malaga Township, C. E. Peters Co.'s No. 1 William Peters, Section 22, open flow of 260,000 cu. ft. of gas in the Salt sand at 1,118-28 ft.

In Noble County, Wayne Township, Doilison Co.'s No. 1 Mary Harding, Section 2, Maxburg 700 and 800-ft. sands missing, abandoned at 750 ft.; R. M. Burns' No. 1 P. E. Rich, Section 9, small Berea sand gas well, depth 1,420 ft.

In Perry County, Clayton Township, Preston Oil Co.'s No. 3 William Griffith, Section 17, 30 bbl. of oil first 24 hours after shot, Clinton at 3,237-75 ft.

In Stark County, Lawrence Township, Obermiller Brothers' No. 1 William Yant, Section 13, Red Clinton sand gaged 330,000 cu. ft. of gas, open flow, sand at 3,987-4,010 ft.

In Washington County, Independence Township, Hall & Henning's No. 1 Charles Ludington, Section 34, abandoned at 1,698 ft.

Texas and Louisiana Gulf

By NEIL WILLIAMS

Open Pool in Acadia Parish; Find New Pay in Eola Field

HOUSTON, Tex., June 24.—The discovery of a shallow field in Acadia Parish, coastal Louisiana; opening of distillate production in the Ogburn area, Harris County, Texas, and scheduled production tests of two promising wildcats in Brazoria and Matagorda counties, were the highlights of development along the Gulf Coast district the past week.

Vicent, Welch and E. J. Nicklos' No. 1 McMannus, Section 21-7s-1w, northeast of the Tepetate field, and on the Ritchie prospect, Acadia Parish, Louisiana, is flowing an estimated 15 bbl. of 28-gravity pipe-line oil, and 2,000,000 cu. ft. of gas per day while cleaning out through a 7/8-in. choke. Tubing pressure was 750 lb., and shut-in casing pressure 850 lb. The well was drilled to 3,537 ft., and the completion was made with 5½-in. casing cemented at 3,536 ft. The bottom 10 ft. of the pipe was perforated.

On the Chenier prospect, southern Cameron Parish, Phillips Petroleum Co. was preparing to test No. 1 Miami Corp., bottomed in a sidetracked hole at 10,655 ft., at which depth a strong flow of salt water was encountered. A short string of casing will be cemented to test sand which showed gas at 10,196-10,207 ft. Location is in Section 11-14s-6w.

H. M. Naylor and others' No. 1 Acadia Development Co., a prospective pool opener on the Mermentau prospect, Jefferson Davis Parish, is being retested. Casing was perforated at 9,700-11 ft., and the well flowed 5 bbl. of 43-gravity distillate and 2 bbl. of salt water per hour through a ⅛-in. choke. Tubing pressure was 4,300 lb., and casing pressure 2,500 lb.

New Pay in Eola

The potentiality of the Eola field, Avoyelles Parish, was enlarged with the opening of the first Cockfield production. Amerada Petroleum Corp.'s No. 9 Glaze, near the apex of the structure in Section 6-2s-3e, flowed 276 bbl. of 35-gravity oil per day from perforated casing at 6,430-46 ft. The well was drilled to 6,485 ft., logging sand and shale showing oil at 6,431-38 ft., and at 6,443-50 ft. Top of the Cockfield section was 6,431 ft. While this is the first well to produce from this section, several wells throughout the field have logged the sand, and additional development may be confined to this sand in view of the fact that the producing limits of the Wilcox sand are practically developed.

The producing limit of the Erath field, Vermilion Parish, is expected to be defined or extended as Strake Petroleum Inc.'s No. 1 Caldwell has reached the critical stage. Late in the week the well was coring in shale below 11,415 ft. It is reported that this well is correlating about 70 ft. higher than the discovery well.

Location for an interesting wildcat was announced for the Choupique prospect, Calcasieu Parish, by Hamman Exploration Co. The well is No. 1 Sabine Rice Lands, Inc., 600 ft. from the north and 1,386 ft. from the east lines of Section 3-11s-11w. This will be the third well drilled on the prospect within the past year. Union Sulphur Co. and Gulf Refining Co. drilled two deep tests in the area without establishing commercial production.

On the Texas Coast

Along the Texas coast and in the Blessing area, Matagorda County, Texas Co. was completing No. 1 Pierce estate as a gas and distillate producer. This well was drilled to 8,971 ft. and 7-in. casing was cemented at 8,365 ft. Perforations were made in the casing at 8,290-8,300 ft., and the well flowed gas and an unestimated amount of distillate on a drill-stem test. Working pressure built up to 500 lb. The well has been killed and additional perforations are being made higher in the section. Location is in the H.&G.N. Survey.

Although no gage was available, distillate production was opened in the Ogburn area, Harris County, as Joyce Richardson's No. 1 Marks flowed gas and distillate through perforated casing at 6,918-26 ft. At the close of the week bottom-hole chokes were being installed to lower the gas pressure so the well could be tested through the separator. It was drilled to 7,248 ft., and casing cemented after drill-stem testing at intervals from 6,400 to 6,900 ft., recovered gas, distillate and salt water. The well topped the Cockfield at 6,231 ft., Discorbis Yeguaensis at 6,370 ft., and the Eponides Yeguaensis at 6,495 ft.

Approximately 1 mile east of the North Houston area, Harris County, Martin Thompson was preparing to make a drill-stem test at No. 1 N. Allen, after logging oil and gas showings in cores at 7,059-74 ft., the total depth. Three feet of gas sand was recovered in a core at 7,059-69 ft., while 4 ft. of soft sand with an oil odor and cut was recovered at 7,069-74 ft.

Prospect of opening another field in Galveston Bay, offshore from Chambers County, was encouraging as Humble Oil & Refining Co. was making an electrical survey and cutting side-wall cores in No. 1-247 State, on Red Fish Reef, approximately 4½ miles southeast of Seabrook. Coring was halted at 9,225 ft., after sandy shale and sand showing oil and gas was recovered in cores at intervals from 9,025 to 9,145 ft. Twenty feet of sandy shale, having a gas odor, was recovered at 9,025-45 ft. Four feet of sand showing oil and gas was logged at 9,045-55 ft., while a core at 9,055-65 ft., recovered 10 ft. of which the top 4 ft. was sand showing oil and gas, and the bottom 5 ft. was sand showing oil and gas. One foot of salt water sand was logged at 9,065-71 ft., and at 9,115-25 ft., 10 ft. of sand and shale showing oil and gas was recovered. Geological markers of the well were not available, although it is believed to be bottomed in the Frio formation.

In the Liverpool area, Brazoria County, Rowan & Nichols were scheduled to test No. 1 Hubbard, bottomed at 10,008 ft., with 7-in. casing cemented at 9,680 ft. The well is expected to test the sand section at 9,107-34 ft., where a recent drill-stem test recovered mud and distillate, and working pressure built up to several hundred pounds.

In Brazoria County, in the Bailey Prairie area, Glenn H. McCarthy's No. 1 W. B. Munson, Samuel Carter Survey, is coring in shale below 11,710 ft. It is reported that 5½-in. casing is on the location and will be cemented in the near future. This well has been drilled "tight," and no information is available as to what showings have been logged.

An important east extension to the Old Ocean field, Brazoria County, is expected to be made as Stanolind Oil & Gas Co. prepared to complete No. 1 Stevenson-Donovan, 4,300 ft. east of the nearest production. Drilled to a total depth of 10,750 ft., screen and liner are being run after perforations were made in the casing at 10,060-72 ft., and at 10,085-10,112 ft.

Two outpost wells in the Anchor field were being restricted after production tests recovered salt water. Sun Oil Co.'s No. 1 Stern perforated casing at 10,630-39 ft., and the well flowed at the rate of 40 bbl. of fluid per hour, of which 35 bbl. was salt water and 5 bbl. was oil. The well is about 1 mile northeast of production in the S. Marsh Survey. Humble Oil & Refining Co.'s No. 2 Mettler, about 3,000 ft. south of production, recovered salt water with no show of oil when tested through perforated casing at 10,493-97 ft.

A new field or an important extension to the Texana field, Jackson County, was indicated by the showing of Masterson & Swiger's (Heep Oil Corp.'s) No. 1 Robertson, about 1½ miles northeast of production. After a drill-stem test through perforated casing at 6,514-18 ft., recovered 2,660 ft. of oil and 40 ft. of brackish water in 30 minutes, screen and liner were run, and the well was brought in flowing an unestimated amount of fluid of which 50 per cent was oil and the balance wash water. Before the well had cleaned itself it went dead, and it was being recompleted at the close of the week. The discovery well of this field was completed as a distillate producer in sand at 5,705-08 ft.

Wellington Oil Co.'s No. 2 L. Ranch, an offset to the recently opened Lolita field, Jackson County, recovered 5,500 ft. of pipe-line oil on a 15-minute drill-stem test at 5,937-43 ft., the total depth, and 5½-in. casing was cemented on bottom.

TEXAS GULF COAST COMPLETIONS IN PROVEN FIELDS

Brazoria County

Old Ocean field: Stanolind Oil & Gas Co.'s No. 2 Giles, perforated casing 10,115-55 ft., 316 bbl. 17 hours, ¼-in. choke. Sun Oil Co.'s No. 5 McCampbell, perforated casing 10,070-10,100 ft., 375 bbl., ¼-in. choke.

Chambers County

Anahuac field: Gulf Oil Corp.'s No. 13 Wilcox, sand 7,056-80 ft., 619 bbl., ¼-in. choke. Humble Oil & Refining Co.'s No. 24 Clark, sand 7,029-80 ft., 707 bbl., ¼-in. choke. South Cotton Lake field: Salt Dome Oil Corp.'s No. 4 Williams, perforated casing 6,507-13 ft., 152 bbl., ⅛-in. choke.

Fort Bend County

Thompson field: Gulf Oil Corp.'s No. 12 Wolters, sand 4,292-4,315 ft., 141 bbl., ⅛-in. choke. Humble Oil & Refining Co.'s No. 30 Davis, sand 5,397-5,410 ft., 284 bbl., ¼-in. choke. Humble Oil & Refining Co.'s No. 47-A Lockwood-Sharp, 5,979 ft., dry and abandoned.

Galveston County

Dickinson field: Humble Oil & Refining Co.'s No. 2 Leith, 9,000 ft., a gas well. Pan American Production Co.'s No. 1 Moore, sand 8,502-42 ft., gas well.

Harris County

Clear Lake field: Humble Oil & Refining Co.'s No. 42-C Humble-West, 5,908 ft., 120 bbl., ¼-in. choke. Friendswood field: Humble Oil & Refining Co.'s No. 35 Beamer, sand 6,015-42 ft., 449 bbl., ¼-in. choke.

Jackson County

West Ranch field: Humble Oil & Refining Co.'s No. 3-B Vanderbilt-State, sand 5,660-68 ft., 267 bbl., ¼-in. choke. Magnolia Petroleum Co.'s No. 1 Scheuch, perforated casing 5,762-67 ft., 505 bbl., ¼-in. choke. Magnolia Petroleum Co.'s No. 82-West, perforated casing 5,122-28 ft., 495 bbl., ¼-in. choke. Renwar Oil Corp.'s No. 2 Phillips, perforated casing 5,758-68 ft., 602 bbl., ¼-in. choke. Shell Oil Co., Inc.'s No. 1 Scheuch, sand 5,750-59 ft., 592 bbl., ¼-in. choke. Superior Oil Co.'s No. 6 Drummond, sand 5,726-76 ft., 538 bbl., ¼-in. choke.

Jefferson County

Lovells Lake field: Humble Oil & Refining Co.'s No. 5-B Steinhagen, sand 7,787-92 ft., 169 bbl., ⅛-in. choke. Shell Oil Co., Inc.'s No. 3 Ross Nelson, sand 7,784-7,807 ft., 160 bbl., ⅛-in. choke. West Beaumont field: Stanolind Oil & Gas Co.'s No. 9 Keith-Dowlen, sand 5,379-90 ft., 86 bbl., 7/8-in. choke.

Liberty County

Esperson field: General Crude Oil Co.'s No. 20 Davis, perforated casing 7,055-7,105 ft., 68 bbl., 7/8-in. choke.

Matagorda County

Bay City field: Atlantic Refining Co.'s No. 1 Steinmeyer and others', sand 9,220-68 ft., 210 bbl., ¼-in. choke.

Stratton Gas-Structure Flank, Nueces County, Develops Oil

By F. L. SINGLETON

CORPUS CHRISTI, Tex., June 24.—The Stratton gas and distillate field in Nueces County was converted into an oil field by Southern Minerals Corp.'s No. 1 Bertram, which was flowing an estimated 100 bbl. of 42-gravity oil per day through a 9/64-in. choke. Tubing pressure was 890 lb. and shut-in casing pressure 1,240 lb. The well was drilled to 6,544 ft., and the completion was made by perforating casing at 6,390-98 ft. The well is on the east flank of the structure about 5,300 ft. east and slightly north of the nearest gas production.

Northwest of Corpus Christi, 2½ miles, and the same distance south of the East White Point field in Nueces Bay, Nueces County, Humble Oil & Refining Co. was preparing to complete No. 1 Nueces Bay-State as a gas well. It has been plugged back from 5,200 to 4,100 ft., and will be completed in sand at 3,979-4,022 ft. The rig will be moved to No. 1-B State, 467 ft. from the south and east lines of state Tract 706.

Skelly Oil Co.'s No. 1 State, offshore from Kleberg County, in Laguna Madre Bay, showed promise of opening another submerged field, as a 24-hour drill-stem test through perforated casing at 7,459-60 ft., developed 120 bbl. of fluid, 80 per cent oil, per day through a ¼-in. choke. Gravity of the oil was 41°. This well was drilled to 9,429 ft., and plugged back to 7,652 ft. It has been killed and cement squeeze jobs made at 7,456-59 ft., and at 7,460-62 ft. to eliminate salt water.

Republic Natural Gas Co. opened gas and distillate production from a new sand on the southwest side of the East White Point field, San Patricio County, as No. 38 Rachal was flowing gas and water-white distillate, while cleaning out, through a ⅛-in. choke. Tubing pressure was 2,200 lb., and casing pressure 2,250 lb. This well missed the regular 5,600-ft. pay and was drilled to 6,315 ft. Casing was cemented on bottom after an electrical survey showed sand at 5,730-77 ft., and 6,275-91 ft. Drill-stem testing through perforated casing at 6,275-80 ft., recovered salt water, and final completion was made by perforating casing at 5,760-70 ft.

In Jim Wells County, Hewitt & Dougherty's No. 1 O. B. Carver, about 1½ miles southwest of the Wade City field, was attracting attention as it cores ahead below 4,900 ft. after coring favorable showings in the 4,800-ft., and 4,900-ft. horizons. Two drill-stem tests were attempted at 4,892-4,913 ft., but the seat of the testing tool failed to hold and the operators decided to drill deeper before attempting another test. The well is on a farmout lease from Sinclair Prairie Oil Co. in the I.&G.N. Survey.

In Jim Wells County, 5 miles south of Bentonville, H. H. Howell's No. 1 Land Bank was abandoned after drill-stem testing showed salt water. There were sands at 5,646-60 ft., and 6,662-66 ft.

Along the Cockfield trend through the eastern half of Duval County, Frank Frohnhoefer's No. 1 Carrillo, miles southwest of the Muralla field, loomed as a possible discovery as a 10-minute drill-stem test at 4,629-40 ft., showed 400 lb. working pressure and 15 ft. of gas-cut mud, with a slight show of distillate. The well is coring in sandy shale below 4,828 ft. after a second 10-minute drill-stem test recovered 1,675 ft. of salt water, and working pressure built up to 4 lb. The Jackson was topped at 3,500 ft., and Hockleyensis at 3,700 ft.

Location for another Tertiary Wilcox test was announced for the district as Continental Oil Co. prepared to move material to the Mount Lucas gas field, Live Oak County. The well is on the Holman Cartwright lease in the Sandman Survey. Contract depth is 10,000 ft.

Approximately 5 miles north of the Rincon field, Starr County, Sun Oil Co.'s No. 1 Claude King was attracting attention as broken sand and shale with an oil and gas odor was cored at intervals from 4,130-4,518 ft. Four drill-stem tests recovered drilling mud, a small amount of oil and tested a maximum of 225 lb. working pressure. The hole is bottomed at 4,526 ft., and drilling is expected to continue. The well is located in the C.C.S.D.&R.G.N.G. Survey 511, about 1 mile south of the company's No. 1 Lehr, recently completed for a small producer in sand at 4,100-54 ft.

Pure Oil Co., and Sal Vieja Oil Co.'s No. 1 Garcia Land & Lumber Co., a deep test in Cameron County, was abandoned after salt water was found at 3,450-8,500 ft. The well is in the Santa Isabel grant, and is the third deep test to be drilled on a block of several thousand acres.

In Brooks County, Sun Oil Co. made a location for a deep wildcat on the Charles Boedecker lease, about 5 miles north of Encino, in Section 16, C.C.S.D.&R.G.N.G. Survey.

Norsworthy Production Co.'s No. 1 Laura Fagan, 1½ miles northwest of the Fagan field, Refugio County, flowed salt water with a slight show of oil when tested through perforated casing at 5,655-58½ ft.; the perforations have been squeezed off preparatory to retesting.

SOUTHWEST TEXAS COMPLETIONS IN PROVEN FIELDS

Caldwell County

Luling field: Magnolia Petroleum Co.'s No. 17 McKean, lime 2,111-18 ft., 95 bbl. oil and 5 bbl. water, pumping.

Calhoun-Victoria Counties

Heyser field: Gulf Oil Corp.'s No. 36-B Traylor, 5,502 ft., dry and abandoned.

Duval County

Cedro Hill field: Magnolia Petroleum Co.'s No. 5 Duval County Ranch Co., sand 1,441-55 ft., 15 bbl. oil and 15 bbl. salt water, pumping. Longhorn field: M. M. Miller's No. 23 fee, sand 4,892-97 ft., 135 bbl., 5/32-in. choke. Tarancahuas field: Cox, Hamon and others' No. 7 Hoffman, sand 2,065-81 ft., 170 bbl., ⅝-in. choke.

Guadalupe County

Darst Creek field: Texas Co.'s No. 9 Wille, 2,595 ft., 309 bbl., pumping. Elm Creek field: P. G. Rouse's No. 4 Neuman, 2,172 ft., dry and abandoned.

Jim Hogg County

Colorado field: Humble Oil & Refining Co.'s No. 12 King, 3,029 ft., 201 bbl., 3/16-in. choke. Sun Oil Co.'s No. 1 Thaxton, sand 2,983-3,001 ft., 126 bbl., 18 hours, 3/16-in. choke.

Nueces County

Agua Dulce field: Sultex Oil Co.'s No. 1 Eliff, 7,010 ft., dry and abandoned. Minnie Bock field: Stanolind Oil & Gas Co.'s No. 4 Parr, perforated casing 3,821-22 ft., 96 bbl., ⅛-in. choke. South Clara Driscoll field: Wellington Oil Co.'s No. 6 Dugger, 5,410 ft., 45 bbl., 7/32-in. choke. Stratton field: Gulf Plains Corp.'s No. 2 Butts, perforated casing 5,006-23 ft., 40 bbl., distillate, ⅛-in. choke.

Refugio County

La Rosa field: Hewitt & Dougherty's No. 4-A Wagner, 8,020 ft., dry and abandoned. Tomoconnor field: Quintana Petroleum Corp.'s No. 36 Heard, perforated casing 5,882-90 ft., 694 bbl., ¼-in. choke.

Jim Wells County

Ben Bolt field: Heyser, Heard and others' No. 6 Garcia, perforated casing 5,278-83 ft., 348 bbl., 3/16-in. choke. Orange Grove field: H. H. Howell and others' No. 2 Schreade, perforated casing 5,087-5,100 ft., 354 bbl., 3/16-in. choke. Premont field: E. C. Hubbel's No. 1 Whitaker, perforated casing 2,355-59 ft., 50 bbl., fluid, 90 per cent water. South Alfred field: Lewis Production Co.'s No. 1 Florence-Adams, perforated casing 4,673-83 ft., 128 bbl., ⅛-in. choke. Wade City field: Anderson-Prichard Oil Corp.'s No. 1 Mueller,

(Continued on Page 143)

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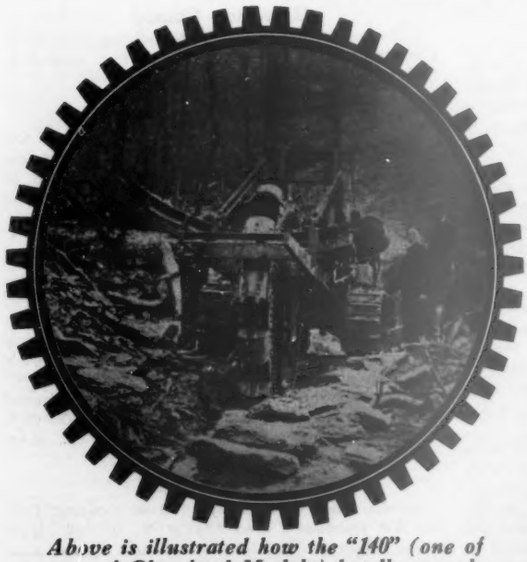

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Tygart District, W. Va., Will Get Another Oriskany Test

By STAFF CORRESPONDENT

PITTSBURGH, Pa., June 24.—In Wood County, West Virginia, Glen W. Roberts and others are starting another Oriskany wildcat on the C. W. Cook farm in Tygart district, on the Belleville Quadrangle. The well is on Sams Creek 5.1 miles south of Lat. 39° 15' and 3.6 miles west of Long. 81° 30'. It is approximately 2½ miles south from Mineral Wells.

In Jackson County, Joe Rubin and others topped Corniferous lime at 4,885 ft., steel line, in the wildcat on the C. E. Andricks farm in Grant district. It is about 315 ft. lower on structure than the discovery well on the Curry farm and 340 ft. lower than the test on the Henry Morrison farm. Casing has been cemented at 4,906 ft., and drilling is now being resumed.

SOUTHEAST OHIO

The best for the week in Southeast Ohio was the test of the Ohio Fuel Gas Co. on the Herman W. Offenbacher farm in Section 19, Harrison Township, Muskingum County. It was completed in Clinton sand at 4,272 ft. as a gas well gaging 4,500,000 cu. ft. a day. It is 34 ft. in the sand and drilling stopped on account of an oil showing.

In Athens County, G. & K. Oil & Gas Co. completed a 6-bbl. well on the W. H. Morrison farm, Section 36, Rome Township, in first Cow Run sand at 420 ft. On Hamley Run, Section 12, Waterloo Township, J. C. Williams completed a 4-bbl. well on the Evaline Young Martin farm in the first Berea at 1,157 ft. It also showed 100,000 cu. ft. of gas a day. In Section 34, Carthage Township, C. W. Nuzum and others completed a gas well on the Albert Bailes heirs in Salt sand, gaging 150,000 cu. ft. a day from a total depth of 999 ft. In Section 19, Lodi Township, Ross, Weimer & Ross completed No. 9 G. H. Ackley in second Berea at 1,637 ft. It is good for 150,000 cu. ft. of gas and 3 bbl. of oil a day.

In Licking County, McClay Brothers drilled a dry hole on the Harry Coffman farm through Clinton sand to 2,884 ft. It is in Section 7, Perry Township. In Section 4, same township, Edward H. Everett Co. drilled No. 1 Ira Mills to 2,900 ft. and it was dry. In Section 7, Perry Township, G. F. Earley and others drilled No. 3 Fairall Brothers to 675 ft., Berea sand, and it was dry.

In Lorain County the Wiser Oil Co. and others completed No. 2 Thomas and Lodeslaus Szuch, Lot 45, Penfield Township, in the Berea grit at 255 ft. It produced 20 bbl. the first day after shot.

In Noble County Wilbur Keith and others completed a test on the P. J. Dorbereiner farm, SW Section 11, Jackson Township, in the Maxton sand at 1,218 ft. It will make a 1-bbl. pumper. In the east half of Section 26, Olive Township, Frank Warren and others completed a test on the Sebastian Crook farm in the 300-ft. sand at 318 ft. It is making about ¾ bbl. a day.

In Washington County E. A. Metcalf's No. 2 Account and others completed No. 6 A. J. King, SW Section 22, Liberty Township, in the Keener sand at 1,340 ft. It produced 20 bbl. the first day without shot.

SOUTHWEST PENNSYLVANIA

In Clarion County Owens-Illinois Glass Co.'s No. 1 Lena C. Longwell, in Monroe Township, total depth 2,598 ft., is a gas well gaging 86,000 cu. ft. a day from the Speechley, Tiona, Sheffield, and Bradford sands. Here this company is building a rig for a test on the P. M. Smathers farm, and T. W. Phillips Gas & Oil Co. is drilling No. 2 Charles Byers at 1,236 ft. In Porter Township, Cottage Hill Gas Co. is drilling No. 1 E. M. Reitz at 1,450 ft. and T. A. Swartzfager and others No. 4 C. A. Swartzfager at 725 ft.

In Indiana County T. W. Phillips Gas & Oil Co. drilled No. 1 Mary and Ethel Henderson in Armstrong Township to 3,547 ft., through the Bradford sand, and it was dry. This company is drilling the following: Washington Township, No. 1 Lavina Richard at 2,450 ft.; Center Township, No. 1 R. & P. Coal Co. at 2,406 ft.; Brush Valley Township, No. 1 Jesse Boyer at 1,422 ft. In South Mahoning Township John Wray and others are building rig for No. 2 James Lukehart. In Armstrong Township, J. C. Rinn is drilling No. 2 Perden heirs at 620 ft.

Armstrong-Westmoreland

In Cowanshannock Township, Armstrong County, Equitable Gas Co. will deepen No. 3 G. W. Smeltzer and Peoples Natural Gas Co. is drilling No. 2 Lee Bell at 3,440 ft. In Plum Creek Township, this company is drilling No. 3 John Shetler at 1,693 ft. and William McCollins' No. 2 Add Reefer at 270 ft. In Kittanning Township, Edward Young is drilling No. 2 Hugh Blair at 2,800 ft. and H. C. Judson No. 1 Robert Watterson at 550 ft. In Mahoning Township, Penn Wayne Gas Co. is drilling No. 1 Elizabeth Foster at 500 ft. and John Wray and others on the King Shaffer farm are fishing. In South Buffalo Township W. A. Baker is testing gas in No. 1 J. Bush and V. Shaffer.

In Wayne Township, Armstrong County, R. C. Galbreath & Co. are drilling No. 2 John Dormire at 1,240 ft. and Watson estate No 1. W. D. McEntire at 3,400 ft.

In Westmoreland County Hyde Park Foundry Co. is drilling No. 1 Andrew Grinder in Allegheny Township at 2,650 ft. In Bell Township Kiski Valley Gas Co. is drilling No. 1 J. F. Wolford at 1,285 ft. In Washington Township Peoples Natural Gas Co. is drilling No. 2 A. J. Idings at 2,305 ft.

Fayette-Greene-Washington

In Nicholson Township, Fayette County, Duquesne Gas Co. completed No. 1 I. Cover in the Fifth sand at 2,377-2,459 ft. as a gas well gaging 60,000 cu. ft. a day from 2,377 ft. and 2,434-36 ft. The total depth was 2,620 ft.

In Menallen Township, Fayette County, Wahler Powers Oil & Gas Co. is drilling No. 1 W. L. Rockwell at 165 ft. and No. 2 Shamrock Farms Co. at 1,900 ft. In German Township, J. H. Carnell is drilling No. 1 Marion Kurzankuski at 1,621 ft.

In Greene County, Hiawatha Oil Co. is drilling No. 1 Thomas Young heirs in Morris Township at 2,700 ft. In Greene Township, A. V. Lewis and others are drilling No. 1 Smith and Pethtel at 1,670 ft. and Fred Garrison shut down No. 1 Henderson Coal Co. at 1,170 ft. In Richhill Township, O. I. Dille and others are drilling No. 2 Madison Hughes at 1,450 ft.

In Monongahela Township, Greene County, John Ingraham and others are spudding in a test on the Bliss Donham farm. In Wayne Township, I. I. White and others are rigging up No. 1 Norman Strosnider and Waynesburg Home Gas Co. drilling No. 1 W. A. Elms at 600 ft.

In Amwell Township, Washington County, Roy Clovis and others completed No. 2 W. S. McClenathan at 1,149 ft. with the Little Dunkard sand topped at 1,094 ft. and 1 bbl. a day at 1,123-32 ft. and 1,141-46 ft. In this township Equitable Gas Co. is drilling No. 1 R. Foster at 2,058 ft. In Somerset Township this company is drilling No. 1 W. W. Wright at 1,569 ft.

In South Franklin Township F. K. Fowcett and others are drilling No. 2 J. C. and Anna Phelan at 1,140 ft. Shivers and others have the rig up for No. 1 Frank Lyseck. In East Finley Township, Manufacturers Light & Heat Co. is deepening No. 2475 Amon England and drilling at 2,875 ft. In Blaine Township, Washington Oil Co. is drilling No. 1 Vera K. Stine at 1,650 ft. In Morris Township Canger and others have rigged up No. 1 W. E. Archer.

(Continued on Page 142)

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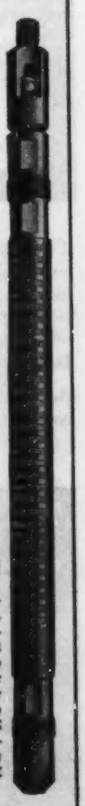

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Midland County's Deep Test Added to Wildcat Failures

By OTTO C. PRESSPRICH

SAGINAW, Mich., June 24.—With Michigan's oil production at the lowest level in a year and a half, more than ordinary interest is being manifested in Central Michigan wildcatting activities which, thus far, have not been promising.

During the past week 24 completions were recorded in established fields, resulting in 16 oil wells with total initial potential of 2,150 bbl. a day; 1 gas well and 7 dry holes, including a Midland County deep test.

Charles W. Teater, discoverer of Midland's Porter field, said the No. 1 Johnston well, which he and Wallace Markle of Bad Axe drilled in Section 8 of Bloomfield Township, Huron County, probably would not be better than a 50-bbl. producer. It was being acidized over the week end after swabbing about 25 bbl. a day for a week. The well is the first producer in the "thumb of Michigan" area and plans are under way for drilling two offsets, regardless of the results in the No. 1 Johnston.

Aside from the Teater-Markle test, operators were interested in developments in two Sun Oil Co. wildcats. Sun's No. 1 Cameron in Section 10, Grout Township, Gladwin County, was being acidized. Over a 4-day stretch the well was reported to have yielded about 25 bbl. of oil. A show of oil in the Traverse at around 2,700 ft. was noted in Sun's other wildcat, No. 1 Whitaker in Section 33 of Pine Township. A deep test being abandoned is C. L. Maguire, Inc.'s No. 1 Clark in Warren Township, Midland County. It picked up a show of gas in the Sylvania. Total depth was 5,117 ft.

New drilling is scheduled in 16 townships in 11 counties, the state Conservation Department last week issued 22 permits. One of note is Cryden Petroleum Corp.'s No. 1 Miller in Section 20 of Sherman Township, Isabella County, a mile northwest of the Sherman field and a mile southeast of a small producer in Sherman which was completed in the Traverse. Another oil test is listed for Lake Township, Missaukee County, and a gas test in Missaukee's Riverside Township. A gas test planned in Sheridan Township, Clare County, is planned in the hope of extending the Grant pool southeast as a possible link with the Wise pool in Isabella County. Four permits each were listed for Allegan and Ottawa counties while Barry and Cass each have two wildcats scheduled. Kent, Monroe and Van Buren get two locations in proven territory.

The Michigan completions summary for last week follows:

Clare County

Lincoln Township (18n-5w)—American Production Co.'s No. 1 John A. Mercier, Section 27, 198,000 cu. ft. of gas, total depth 1,536 ft.

Redding Township (19n-6w)—Taggart Brothers, Inc.'s No. 28 State, C S½ NW SE Section 8, abandoned as dry at 1,530 ft.

Allegan County

Heath Township (3n-14w)—Brailey-Heath Oil Syndicate's No. 1 Albert Stankey, Section 4, completed at 1,438 ft., rated at 720 bbl. per day. W. Spencer Cook's No. 1-B Edward Schaap, Section 3, 129 bbl. a day from 1,465 ft. Howard E. Fowler's No. 1 Albert Stankey, Section 4, 100 bbl. per day at 1,413 ft. Bridger Basin Oil Corp.'s No. 2 Nevenzel, Section 30, 80 bbl. per day at 1,559 ft. Fisher-McCall Oil & Gas, Inc.'s No. 1 Steve Kalmink, Section 9, 40 bbl. per day, at 1,532 ft. Frank S. Vahue's No. 3 John Klein, C E½ W½ W½ Section 10, dry and abandoned at 1,560 ft.

Overisel Township (4n-14w)—H. C. Nelson's No. 1 F. Peters, Section 8, total depth 1,479 ft., rated at 150 bbl. per day.

Kent County

Walker Township (7n-12w)—Certain-Teed Products Co.'s No. 19 fee, Section 34, completed at 1,816 ft., and No. 20 fee, Section 34, total depth of 1,790 ft., about 45 bbl. per day each. R. E. King's No. 1 Burgess, NW NE NE Section 32, total depth 1,907 ft., initial production 144 bbl.

Midland County

Jasper Township (13n-2w)—Pure Oil Co.'s No. 21 Bond-Root and others, Section 3, acidized; rated at 125 bbl. a day; completion depth 3,438 ft.

Warren Township (16n-2w)—C. L. Maguire, Inc.'s No. 1 Charles Clark, Section 32, was abandoned as dry at 5,117 ft.

Osceola County

Marion Township (20n-7w)—Roymor Corp. and D. E. Hughes, abandoned No. 1 William Vallad, Section 25, at 3,901 ft.

Ottawa County

Holland Township (5n-15w)—Voorhees Drilling Co. and others completed No. 1 John Petroelji, Section 36, dry at 1,504 ft.

Tallmadge Township (7n-13w)—Gordon Oil Co. and Bolger Oil Co.'s No. 1 Harm Daling, Section 14, 60 bbl. per day, total depth 1,860 ft. Gordon Oil Co. and others' No. 1 C. W. Ostenson, Section 14, 84 bbl. per day, at 1,862 ft. Gulf Refining Co.'s No. 1 Roelf Bronkema, SE NW NW Section 23, total depth 1,886 ft., 43 bbl. per day. Wolverine Natural Gas Corp.'s No. 1 Edward Haga, Section 14, total depth 1,875 ft., 35 bbl. per day.

Swanson Consolidated Oil Co.'s No. 1 Charles Lautenbach, Section 28, 10 bbl. per day, total depth 1,938 ft.

Van Buren County

Bangor Township (2s-16w)—Gratiot Oil & Gas Operations Co.'s No. 2 James Drake, Section 21, which was completed at a depth of 995 ft., for 360 bbl. per day.

Covert Township (2s-18w)—Shelbow Oil Co.'s No. 1-A Jackson, Section 29, was abandoned as dry at 1,226½ ft., and A. G. Hinz's No. 1 Ida C. Bray, SE NE SE Section 25, drilled to 932 ft., was also a dry hole.

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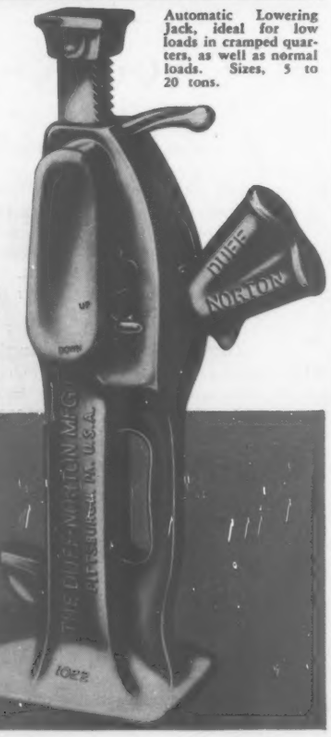

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Eastern Fields

(Continued from Page 141)

WEST VIRGINIA

In Calhoun County, West Virginia, South Penn Natural Gas Co. completed No. 4 J. S. Sharps in Sherman district at 2,260 ft., Injun sand, for 15 bbl. a day. In Clay County, same company completed No. 115 O. D. Stockley in Henry district in Injun sand at 1,791 ft., good for 10 bbl. a day.

In Ritchie County A. R. Kelly and others completed a test on the A. C. Satterfield farm in Grant district at 1,925 ft., Squaw sand, and it is a 2-bbl. pumper.

Gas Wells

In Cabell County Leonard Paugh completed No. 2 fee in Guyandotte district at 3,222 ft., a small gasser.

In Calhoun County W. H. Bickel completed No. 2 B. B. Belford in Center district at 1,840 ft., Injun sand, good for 60,000 cu. ft. of gas a day.

In Lincoln County R. H. Adkins, trustee, completed No. 2 Irene Perry (mineral) in Carroll district at 3,626 ft. It gages 94,000 cu. ft. a day.

In Monongalia County Dunn Mar Oil & Gas Co. deepened No. 1 Lucy Stull in Clay dstirict to 2,985 ft., with added gas from the Bayard sand, gaging 132,000 cu. ft. a day.

In Ritchie County Lowther & Shuman completed a dry hole on the Boyd Wilson farm in Grant district in the Squaw sand at 1,815 ft.

In Wayne County G. L. Meabon drilled a failure on the Grover Chadwick farm in Union district to 1,952 ft. It had a showing of 1½ bbl. of oil a day but the shot did not improve it and it will be plugged.

In Wetzel County, George Eagon drilled a test on the Rose Garrett farm in Center district through the Fifth sand to 3,080 ft. and it was dry.

Oriskany Gas Field

No wells were completed in the Oriskany gas fields in Kanawha County.

Southwest Texas Fields

(Continued from Page 140)

perforated casing 4,910-18 ft., 198 bbl., 3/16-in. choke. Atlantic Refining Co.'s No. 1 Albrecht, perforated casing 4,915-20 ft., 186 bbl., ⅛-in. choke. O. W. Killam's No. 9 Wade, 5,393 ft., dry and abandoned.

San Patricio County

East White Point field: Plymouth Oil Co.'s No. 10 Solar-Ficke, perforated casing 5,668-72 ft., and 5,676-80 ft., 107 bbl., 7/64-in. choke. Republic Natural Gas Co.'s No. 26 Rachal, perforated casing 5,630-45 ft., 105 bbl., ⅛-in. choke. Sinclair Prairie Oil Co.'s No. 2-977 State, perforated casing 5,630-39 ft., 104 bbl., ⅛-in. choke. Midway field: Phillips Petroleum Co.'s No. 1-A Schmidt, perforated casing 5,626-29 ft., 95½ bbl., ⅛-in. choke.

Starr County

Rincon field: W. R. Davis' No. 26-B Slick, perforated casing 3,635-46 ft., 20 bbl. 9 hours, ⅛-in. choke. Sun field: Humble Oil & Refining Co.'s No. 8 Montalvo, 4,872 ft., 97 bbl., 9/64-in. choke.

Webb County

Glen field: O. W. Killam's No. 2 Bruni, sand 2,183-86 ft., 100 bbl., pumping. Transwestern Oil Co.'s No 2 Bruni, sand 2,168-78 ft., 960 bbl., ½-in. choke. Volpe field: J. H. Reynolds' No. 1 Dinn, 2,580 ft., dry and abandoned. West Cole field: Magnolia Petroleum Co.'s No. 3 Benavides, sand 2,342-49 ft., 25 bbl. oil and 10 bbl. water, pumping.

Williamson County

Thrall field: Magnolia Petroleum Co.'s No. 51 Stiles, 806 ft., dry and abandoned. Red Bank Oil Co.'s No. 1 Dollinger, 645 ft., dry and abandoned.

Zapata County

Escobas field: Dulup Oil Co.'s No. 43 Trevino, sand 1,368-77 ft., 40 bbl., pumping. Texas Co.'s No. 134 Measles, perforated casing 1,118-26 ft., gas well.

Illinois Fields

(Continued from Page 128)

bbl. of oil and 41 bbl. of water; Stewart's No. 2 Rhodes, Section 26, dry and abandoned at 1,613 ft.; Carter's No. 12 McClain, 70-qt. shot at 1,544-65 ft. and 1,577-80 ft. ripped casing at 1,482-86 ft. and 1,498-1,504 ft., pumped 696 bbl. In Township 7n-3e Carter Oil Co.'s No. 1 Kimbrell, Section 17, 1,500 to 1,574 ft., at intervals pumped 168 bbl. of oil and 2 bbl. of water. In Township 6n-3e Texas Co.'s No. 4 Chrisman, Section 30, total depth 1,574 ft., pumped 245 bbl. Zephyr Drilling Co.'s No. 9 Smith, Section 31, total depth 1,618 ft., pumped 240 bbl. All the wells had been shot.

In Clinton County Pray & Bell's No. 1 Knolhoff, Section 11-1n-2w, 1,320-28 ft., shot, pumped 70 bbl. of oil and 70 bbl. of water. Oil Producers, Inc.'s No. 1 Vandeloo, Section 8-1n-3w, 2,502-30 ft., acidized, pumped 100 bbl. of oil and 10 bbl. of water.

In Wayne County Lessing Alch's No. 1 Dickey, Section 3-1s-6e, pumped 10 bbl. of oil and 15 bbl. of water in 12 hours and pumped off. Pay is McClosky lime. Oil Well Drilling Co.'s No. 1 Lawrence, Section 34-1s-7e, Fredonia lime 3,233 ft., total depth 3,275 ft., flowed 730 bbl. in 21½ hours. Pure Oil Co.'s No. 1 Burton, Section 3-1s-7e, dry and abandoned at 3,213 ft. Puckett's No. 4-A Oakley, Section 34-2s-8e, a 40-bbl. well in the McClosky lime at 3,372-89 ft. Texas Co.'s No. 5 Boggs, Section 8-3s-7e, 3,352-60 ft., pumped 60 bbl. of oil and 6 bbl. of water.

In Jefferson County Gibson & Jennings' No. 2 Charles Hill, NE SE NW Section 36-2s-1e, dry and abandoned at 2,105 ft.

In Washington County Hubbard's No. 1 Bernrenter, SE SW NW Section 14-3s-3w, dry and abandoned at 1,272 ft. Leo Horton's No. 4 Bielotowicz, SW SE NE Section 22-3s-3w, a 30-bbl. well at 1,280-94 ft.

In White County Nation Oil Co.'s No. 1 McIntosh, Section 31-3s-8e, dry and abandoned at 3,390 ft. Sun Oil Co.'s No. 2 Brown, Section 2-4s-9e, McClosky at 3,372-73 ft., 287 bbl. in 8 hours, 5 per cent water. Bay Oil Co.'s No. 1 Vaufel, Section 2-4s-9e, dry and abandoned at 3,400 ft. Exchange Oil Co.'s No. 6 Rudolph, Section 12-6s-9e, Waltersburg sand at 2,279½-82 ft., flowed 177 bbl. Exchange Oil Co.'s No. 10 Storms, Section 14-6s-9e, sand at 2,248-63 ft., shot, flowed 175 bbl., 6 per cent water. Carter Oil Co.'s No. 8 Poole, Section 25-6s-8e, Hardinsburg sand at 2,495-2,555 ft., shot, 75 bbl. Shell Oil Co.'s No. 1 Beagle, Section 6-6s-7e, Cypress sand at 2,663-81 ft., shot, pumped 220 bbl. Eason Oil Co.'s No. 3 Storms E. NW NE SW Section 15-6s-9e, no show of oil at 2,276 ft., hole junked.

In Williamson County Nation Oil Co.'s No. 1 Coleman, Section 1-10s-1e, dry and abandoned at 2,021 ft., Fredonia lime topped at 1,940 ft. Carterville Oil & Gas Co.'s No. 1 Cannon, Section 1-10s-1e, Ste. Genevieve lime top at 1,890 ft., dry and abandoned at 2,045 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—The past week's completions and new operations in western Kentucky were as follows:

Breckinridge County, 4 miles east of Cloverport: C. V. Guthrie's No. 1 Dick Robertson, moving in.

Daviess County, Handyville district: Cameron & Hupp's No. 3 Lula Akins, abandoned at 1,299 ft.; A. Teller, trustee's No. 2 E. F. Lebold, West Tract, moving in: Master Oil Co.'s No. 6 E. W. Richmond, 40-bbl. well in Jett sand at 1,178-1,203 ft. Utica district: J. C. Ellis' No. 4 J. C. Ellis, spudding; H. C. Farmer and others' No. 5 Martin Weaver, moving in.

Henderson County, 3 miles north of Sebree: T. L. Boyce's No. 4 Arabella Walker, skidding rig 100 ft. west of No. 3 to drill a Pennsylvanian sand test.

Ohio County, Oklahoma district: A. Teller, trustee's No. 9 Archie Dickens, drilling at 640 ft.; Concord Church district: J. R. Williams' No. 2 C. Carden, drilling at 300 ft.; Pattyville School district: Parks & Moore's No. 1 H. T. Stone, spudding in.

EASTERN KENTUCKY

ASHLAND, Ky., June 24.—Kentucky-West Virginia Gas Co. completed No. 584 Jeffie Hall on Isaac Fork of Right Beaver at a total depth of 3,269 ft., in shale. The well is good for 273,000 cu. ft. of gas per day.

Jim Hollon and others' No. 3 D. R. Rose, 1½ miles east of Hazel Green, Wolfe County, reached a total depth of 1,896 ft. Shot with 40 qt., the well filled up 900 ft. with oil and later was reported to have pumped 60 bbl. in 24 hours.

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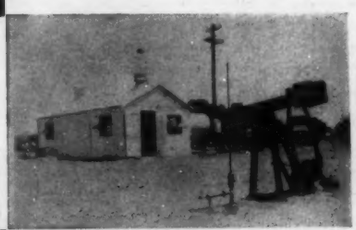

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Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ont., June 22.—Production of crude and naphtha from all Canadian fields in March totaled 570,131 bbl. compared with 655,586 bbl. in February and 385,273 bbl. in March 1939. For the 3 months of 1940 the output was 1,712,576 bbl. against 1,276,615 bbl. in the same period last year, an increase of 34.1 per cent.

Natural-gas production in Canada during March totaled 3,862,351,000 cu. ft. against 3,722,181,000 cu. ft. in the same month last year. For the 3 months of 1940 the Canadian output amounted to 13,017,721,000 cu. ft. compared with 11,955,303,000 cu. ft. in the same period last year, an increase of 8.9 per cent.

Turner Valley Potential

Turner Valley potential based on tests with 1-in. choke is now estimated at 95,000 bbl. a day. The field allowable for 104 crude producers is 18,429 bbl. It is estimated that under best field practice the maximum flow would be around 40,000 bbl. Actual deliveries, on account of the large number of wells on test, have run from 19,000 to 23,000 bbl. a day. Stocks of crude and refined products have been reduced from their high level in May as a result of good weather and farming activity and an upward revision of the allowable is anticipated, though a good part of the increase will likely be required for new completions.

Turner Valley Completions

In Section 7-19-2w5, West Central Turner Valley, Royalite Oil Co.'s No. 48, LSD 10, finished in the lime at 7,533 ft., has made official test through 1-in. choke. The initial flow was around 1,800 bbl. a day, indicating the well will be among the largest in the field. Location is about 1½ miles southeast of Arrow No. 1, the largest producer in Turner Valley, but offsets Anglo-Canadian Oil Co.'s No. 8 which finished a small producer in a tight lime formation. The strike will likely encourage further drilling in Section 7-19-2w5.

In Section 17-18-2w5, southwest Turner Valley, Royalite Oil Co.'s No. 50, LSD 7, finished at 7,790 ft., is acidizing and testing. In Section 20-18-2w5, York Oils' No. 3, LSD 3, finished in the lime at 8,024 ft., is testing.

In Section 32-18-2w5, Royal Canadian Oil Co., LSD 12, finished in the Madison at 8,019 ft., has completed major acid treatment and is testing for allowable. It made around 1,000 bbl. a day, but is being held to 400 bbl. till tests are completed.

In Section 6-19-2w5, West Central Turner Valley, Kamalta Oils' No. 1, LSD 1, finished at 8,128 ft., has been given final acid treatment in the lower porous zone, which subsequently produced 580 bbl. in 24 hours. The well, located in the "tight lime" area, carried casing through the upper porous zone into the hard band above the lower producing horizon. The latter yielded 398 bbl. after application of 2,500 gal., which was stepped up to 580 bbl. after a final shot of 5,000 gal. The upper zone is being perforated and acidized with prospects of a good producer.

In Section 18-19-2w5, Davies Petroleums' No. 5, LSD 10, finished in the lime at 7,391 ft., has responded to further acid treatments with some improvement in flow, and is likely to be a commercial producer. Calmont-Northwest's No. 1, LSD 3, same section, finished at 7,609 ft., is testing.

In North Turner Valley, Anglo-Phillips' No. 1, LSD 14, Section 15-20-3w5, has cemented off the lower horizon of the lime following water intrusion, and is acidizing and testing the upper porous zone.

In Section 27-20-3w5, Foothills Oil & Gas Co.'s No. 6, LSD 5, finished at 8,140 ft., 10 ft. in the black lime. It got the Madison at 7,668 ft.

British Columbia Test

In the Peace River block of northern British Columbia, Provincial's No. 1, Commotion Creek, is below 1,509 ft.

Vermilion Field

In the Vermilion field, East Central Alberta, Franco-Battleview's No. 2, LSD 13, Section 20-50-5w4, bottoming at 1,842 ft., is making up to 150 bbl. a day after installing gravel pack to overcome sanding. Location is 6½ miles east of Vermilion. The heavy asphaltic crude is being shipped to the Saskatchewan Power Commission at North Battleford for fuel oil. Franco-Battleview's No. 3, LSD 13, Section 20-48-5w4, got the sand at 1,757 ft., when oil rose 350 ft. in the hole, and a similar producer is indicated after gravel pack is installed.

Lloydminster Field

In the Lloydminster field, Shaw Petroleums' No. 2, LSD 10, Section 25-49-1w4, bottoming in the Lower Cretaceous formation at 1,771 ft., has drilled out cement and is running gravel pack preparatory to pumping test. Potential production is estimated around 175 bbl. a day.

Valley Crude Anniversary

Turner Valley on June 16 marked the fourth anniversary of the completion of Turner Valley Royalties' No. 1, which on June 16, 1936 opened the west-flank crude area. Prior to that time Turner Valley was a wet-gas and naphtha field, though two crude wells, Models 1 and 2, had been completed in the north end of the field. There are now 104 listed crude producers with estimated potential of 95,000 bbl. a day, and eight additional wells testing.

Turner Valley No. 1 started production in June 1936 with approximately 900 bbl. a day from the Madison limestone. It is still a producer, with a restricted quota of 88 bbl. Up to May 31, 1940, the well had produced 562,852 bbl. of crude and earned a gross revenue of $851,280.36 from production.

Federal Oil Surveys

Operations of the Geological Survey of Canada this summer will include the sending of five survey parties to potential Alberta oil areas. Dr. G. S. Hume will complete his studies of the Pekisko area and Langford Creek, in the southern foothills, and in the Vermilion area of East Central Alberta. H. H. Beach will cover some 400 sq. miles in the Morley and Bearberry areas, and B. R. MacKay will do similar work in the Nordegg and Wawa areas. C. O. Hage will carry on geological mapping of the Mill Creek area in the southern foothills; and Dr. J. S. Stewart will commence work in the Steveville and Redcliff areas, comprising some 6,000 miles, in southeastern Alberta. In addition, extensive topographical work will be carried on in various parts of the province.

In Saskatchewan, G. M. Furnival will study the Cypress Hills area to determine its oil and gas possibilities. In Ontario, J. F. Cayley will study oil possibilities over an area of about 3,000 sq. miles in the Bruce Peninsula.

In southern Alberta a group of Calgary, Vancouver and Victoria men are planning to drill on acreage of Lloyd Clinch and associates extending south from the Milk River ridge to the international boundary. The area is southeast of Spring Coulee and Del Bonita, and a seismic survey was made some years ago.

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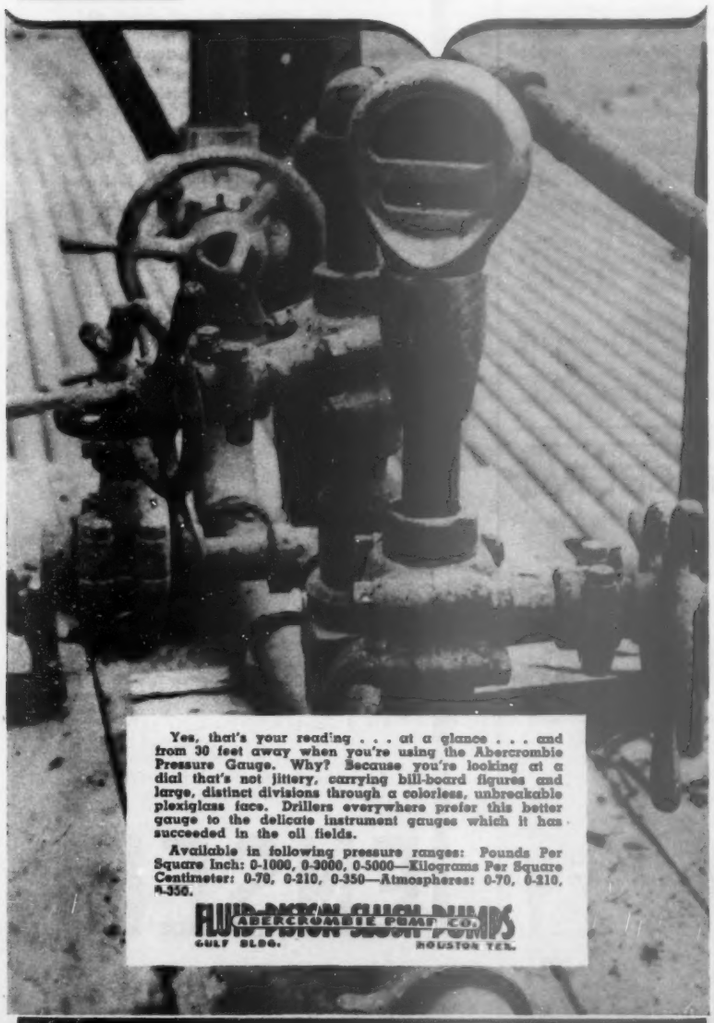

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GIDDENS-LANE BUILDING -:- SHREVEPORT, LA.

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S.	T.	R.	Depth	Status—
Union Oil, No. 3 Austin, Dominguez, Los Ang.	32-	3-	13	6,860	sd. sh. drlg.
Union Oil, No. 77 Callender, Dominguez, Los Ang.	29-	3-	13	4,161	sd. sh. drlg.
Union Oil, No. 14 Carson, Dominguez, Los Ang.	33-	3-	13	8,095	redrlg. 7,171
Shell Oil, No. 105 Reyes, Dominguez, Los Ang.	34-	3-	13	4,400	sd. sh. drlg.
Seaport Oil, No. 1 Dasteel, Dominguez, Los Ang.	32-	3-	13	8,209	P.B. 8,095
Wood-Mellon Oil, No. 1 West, Dominguez, Los Ang.	31-	3-	13	6,560	sd. sh. drlg.
Mission Oil, No. 1 Pierce, Rosecrans, Los Angeles	20-	3-	13	8,471	sd. sh. drlg.
Crest Oil, No. 1 Wolfe, Rosecrans, Los Angeles	20-	3-	13	3,283	sd. sh. drlg.
So. Cal. Pet., No. 2 Rowena, Rosecrans, Los Angeles	19-	3-	13	7,300	sd. sh. drlg.
St. Anthony Oil, No. 2 Gordon, Rosecrans, Los Ang.	19-	3-	13	6,751	sd. sh. drlg.
Kelly & Sons, No. 3 McMillen, Rosecrans, Los Ang.	19-	3-	13	4,586	sd. sh. drlg.
Chicago Oil, No. 1 Founders, Rosecrans, Los Ang.	20-	3-	13	7,963	salt water
Thorley Oil, No. 1 Athens, Rosecrans, Los Angeles	7-	3-	13	7,640	sd. sh. drlg.
Inca Oil, No. 1 Union, Rosecrans, Los Angeles	18-	3-	13	7,016	redrlg. 6,192
Bush Oil, No. 1 Sentous, Inglewood, Los Angeles	17-	2-	14	6,250	sd. sh. drlg.
Turf Oil, No. 1 H.R.A., Potrero, Los Angeles	34-	2-	14	8,390	flow 50 b.d.
Casa Grande Oil, No. 1 Lopez, San Fernando, L. A.	1-	2-	15	3,440	sd. sh. drlg.
Parry, G. C., No. 1 Moynier, San Fernando, Los Ang.	6-	2-	14	3,290	sd. sh. drlg.
Tide Water A. O., No. 14 Porter, Aliso Canyon, L. A.	27-	3-	16	2,460	sd. sh. drlg.
Tide Water A. O., No. 15 Porter, Aliso Canyon, L. A.	27-	3-	16	5,056	sd. sh. drlg.
Tide Water A. O., No. 22 Porter, Aliso Canyon, L. A.	27-	3-	16	4,370	sd. sh. drlg.
Brit. Amer. Oil, No. 1 Perkins, Newhall, Los Ang.	14-	3-	16	6,098	sd. sh. drlg.
Creighton-Hammon Synd., No. 1 C-H, Newhall, L. A.	17-	3-	16	736	sd. sh. drlg.
Havenstrite, R. E., No. 1 Lincoln, Newhall, Los Ang.	16-	4-	17	1,962	sd. sh. drlg.
Barnsdall Oil, No. 11 R.S.F., Newhall, Los Angeles	26-	4-	17	5,810	sd. sh. drlg.
Barnsdall Oil, No. 12 R.S.F., Newhall, Los Angeles	26-	4-	17	3,584	sd. sh. drlg.
General Pet., No. 2 P.E., Wilmington, Los Angeles	35-	4-	13	4,120	P.B. 3,790
Atlantic Oil, No. 16 Harbor, Wilmington, Los Ang.	33-	4-	13	5,250	sd. sh. drlg.
Barnhart & Morrow, No. 2 Comm., Wilm., Los Ang.	32-	4-	13	3,720	flow 255 b.d.
Coast Line Oil, No. 1 Harbor, Wilmington, Los Ang.	32-	4-	13	3,708	completing
Continental Corp., No. 9 L.A.C.F.C., Wilm., L. A.	2-	5-	13	2,141	sd. sh. drlg.
Dumm Bros. Pet., No. 6 Harbor, Wilmington, L. A.	32-	4-	13	3,728	flow 175 b.d.
Long Beach Dev., No. 13-W Harbor, Wilm., L. A.	3-	5-	13	4,072	flow 756 b.d.
Long Beach Dev., No. 14-W Harbor, Wilm., L. A.	10-	5-	13	4,006	flow 410 b.d.
Power, E. D., No. 17 Harbor, Wilmington, L. A.	35-	4-	13	3,470	flow 185 b.d.
Superior Oil, No. 1-B Island, Wilmington, Los Ang.	8-	5-	13	4,960	sd. sh. drlg.
Union Pacific R. R., No. 142, Wilmington, Los Ang.	3-	5-	13	4,017	P.B. 3,978
Union Pacific R. R., No. 143, Wilmington, Los Ang.	3-	5-	13	3,970	sd. sh. drlg.
Union Pacific R. R., No. 145 Wilmington, Los Ang.	3-	5-	13	3,825	flow 880 b.d.
Union Pacific R. R., No. 146, Wilmington, Los Ang.	3-	5-	13	4,043	sd. sh. drlg.
Union Pacific R. R., No. 25-E, Wilmington, Los Ang.	3-	5-	13	4,037	completing
Union Oil, No. 12 Sansinena, Whittier, Los Angeles	31-	2-	10	5,157	no showings
Kern Oil, No. 28 Monterey, Montebello, Los Ang.	2-	2-	12	6,731	will deepen
Kern Oil, No. 31 Monterey, Montebello, Los Ang.	2-	2-	12	7,865	P.B. 7,805
Kern Oil, No. 33 Monterey, Montebello, Los Ang.	2-	2-	12	7,730	will deepen
Kern Oil, No. 42 Monterey, Montebello, Los Angeles	2-	2-	12	6,982	sd. sh. drlg.
Kern Oil, No. 3 Taylor, Montebello, Los Angeles	2-	2-	12	7,790	flow 817 b.d.
Chemical Oil, No. 1 Chemiculture, Montebello, L. A.	12-	2-	12	7,474	O.S. drlg.
Mabee Co., No. 6 Mulholland, Montebello, Los Ang.	2-	2-	12	7,690	O.S. drlg.
Traders Oil, No. 1 Dudy, Montebello, Los Angeles	2-	2-	12	6,340	will deepen
Stanley Oil, No. 1 Mont., Montebello, Los Angeles	2-	2-	12	7,621	will deepen
Standard Oil, No. 1 Kaufman, Montbello, Los Ang.	2-	2-	12	7,859	P.B. 7,800
Herley-Kelly, No. 1 Burke, Montebello, Los Ang.	2-	2-	12	6,460	will deepen
Dormax Oil, No. 2 Signal, Long Beach, Los Angeles	30-	4-	12	5,342	redrlg. 4,792
Exeter Oil, No. 3 Olson, Long Beach, Los Angeles	19-	4-	12	4,597	pump dry
Texas Co., No. 6 Bauman, Long Beach, Los Angeles	19-	4-	12	705	sd. sh. drlg.
Bush, S. C., No. 3 Exchange, Long Beach, Los Ang.	30-	4-	12	2,448	cmtd. 2,448
Tucker, H. M., No. 1 Heath, Buena Park, Orange	34-	3-	11	8,598	gr. sd. drlg.
Bartholomae Oil, No. 9 Stern, East Coyote, Orange	22-	3-	10	6,580	pump 170 b.d.
Garliepp, F., No. 3 Yorba, East Coyote, Orange	19-	3-	9	3,346	sd. sh. drlg.
Hathaway Oil, No. 5 Coyote, East Coyote, Orange	17-	3-	9	4,286	reaming
Standard Oil, No. 70 Emery, West Coyote, Orange	24-	3-	11	1,181	sd. sh. drlg.
Southwest Expl., No. 29 State, Hunt. Beach, Orange	10-	6-	11	4,535	pump 350 b.d.
Standard Oil, No. 41 Bolsa, Hunt. Beach, Orange	34-	5-	11	2,950	pump 75 b.d.
Standard Oil, No. 42 Bolsa, Hunt. Beach, Orange	34-	5-	11	2,260	sd. sh. drlg.
Surf Associates, No. 1 State, Hunt. Beach, Orange	10-	6-	11	1,966	sd. sh. drlg.
Termo Co., No. 409-4 State, Hunt. Beach, Orange	10-	6-	11	4,719	redrlg. 3,398
Bolsa Chica Oil, No. 6 Wilson, Hunt. Beach, Orange	10-	6-	11	2,990	sd. sh. drlg.
Continental Oil, No. 3 Bixby, Seal Beach, Orange	11-	5-	12	4,775	redrlg. 3,130
Security L. & W., No. 1 Security, La Habra, Orange	9-	3-	10	1,898	cleaning out
Morton, L. C., No. 1 Thomas, Anaheim, Orange	23-	4-	10	1,100	sd. sh. drlg.

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well, location, and county—	S.	T.	R.	Depth	Status—
Cole, F. E., No. 1 Giacomini, Santa Maria, Santa Bar.	24-	10-	35	4,806	pump water
Union Oil, No. 2 Pezzoni, Betteravia, Santa Bar.	33-	10-	35	1,898	sd. sh. drlg.
Union Oil, No. 22 Squires, Santa Maria, Santa Bar.	26-	9-	34	3,785	rig to pump
Republic Pet., No. 2 Hollister, Gaviota, Santa Bar.	36-	5-	33	982	sd. sh. drlg.
Oil Group, No. 1 Hyland, Summerland, Santa Bar.	16-	4-	26	2,940	cleaning out
Petrol Corp., No. 3-15 Tognazzini, Gato Ridge, S. B.	15-	8-	32	2,900	flow 2,100 b.d.
Sulphur Springs Oil, No. 1 Janss, Conejo, Ventura	33-	2-	19	3,480	hd. sh. drlg.
El Rancho Oil, No. 4 Elkins, Shiells Canyon, Vent.	9-	3-	19	3,050	P.B. 3,040
Santa Clara Oil, No. 1 Well, Shiells Canyon, Vent.	3-	3-	19	3,245	O.S. drlg.
Rio Hondo Oil, No. 1 Cosby, Hopper Canyon, Vent.	14-	4-	19	1,497	sd. sh. drlg.
English, J. A., No. 3 Lankershim, Hopper Canyon, V.	13-	4-	19	481	sd. sh. drlg.
G. E. Dev., No. 7 Hill, Hopper Canyon, Ventura	13-	4-	19	930	sd. sh. drlg.
Merchants Pet., No. 8 Cochran, Sespe, Ventura	1-	4-	20	2,392	sd. sh. drlg.
Continental Oil, No. 17 Grubb, San Miguelito, Vent.	24-	3-	24	3,360	sd. sh. drlg.
C. C. M. Oil, No. 32-B Hobson, Rincon, Ventura	8-	3-	24	1,691	sd. sh. drlg.
C. C. M. Oil, No. 34-B Hobson, Rincon, Ventura	16-	3-	24	4,095	sd. sh. drlg.
C. C. M. Oil, No. 35-B Hobson, Rincon, Ventura	16-	3-	24	5,375	P.B. 5,135
Tide Water A. O., No. 7 V.L.W., Vent. Ave., Vent.	23-	3-	23	7,367	sd. sh. drlg.
Tide Water A. O., No. 46 V.L.W., Vent. Ave., Vent.	24-	3-	23	7,943	sd. sh. drlg.
Tide Water A. O., No. 17 McGonigle, Vent. Ave., V.	23-	3-	23	10,050	flow 1,345 b.d.
Tide Water A. O., No. 116 Lloyd, Vent. Ave., Vent.	26-	3-	23	4,998	sd. sh. drlg.
Tide Water, A. O., No. 22 Hartman, Vent. Ave., V.	22-	3-	23	8,980	hd. sh. drlg.
Tide Water A. O., No. 25 Hartman, Vent. Ave., V.	22-	3-	23	7,350	cmtd. 7,270
Tide Water A. O., No. 27 Hartman, Vent. Ave., V.	22-	3-	23	6,575	will deepen
Shell Oil, No. 117 Taylor, Ventura Ave., Ventura	21-	3-	23	9,170	sd. sh. drlg.
Shell Oil, No. 119 Taylor, Ventura Ave., Ventura	29-	3-	23	7,382	sd. sh. drlg.
Shell Oil, No. 120 Taylor, Ventura Ave., Ventura	29-	3-	23	6,572	sd. sh. drlg.
Cal. Alliance Pet., No. 1 Schmidt, Vent. Ave., Vent.	21-	3-	23	8,988	O.S. drlg.
British American Oil, No. 1 Barn., Vent. Ave., Vent.	22-	3-	23	8,405	recmtd. 8,300
British American Oil, No. 10 Hart., Vent. Ave., V.	21-	3-	23	7,780	O.S. drlg.
Lloyd Corp., No. 5 Dabney, Ventura Ave., Vent.	24-	3-	23	7,870	sd. sh. drlg.
Trico, O.&G., No. 3 Newland, Delano gas field, Kern	21-	24-	23	2,350	sd. sh. drlg.
North Kern Oil, No. 1 Ranch, Fowler, Kern	16-	25-	22	6,620	idle
Hoyt, Otis, No. 1 Young, McKittrick, Kern		6-	30-22	2,526	cleaning out
Burrhus, V. E., No. 1 Front, McKittrick, Kern	30-	30-	22	3,140	sd. sh. drlg.
Belridge Oil, No. 7-1 fee, North Belridge, Kern		1-	28-20	7,880	br. sh. drlg.
Belridge Oil, No. 10-1 fee, North Belridge, Kern		1-	28-20	8,250	flow 187 b.d.
Belridge Oil, No. 3-35 fee, North Belridge, Kern	35-	27-	20	8,400	redrlg. 7,640
Continental Oil, No. 4 Result, North Belridge, Kern	36-	27-	20	8,090	sd. sh. drlg.
Tide Water, A. O., No. 33-21 Bel., North Bel., Kern	21-	27-	20	6,082	br. sh. drlg.
Texas Co., No. 1 Theta, Shale Hills, Kern	12-	28-	19	3,912	sd. sh. drlg.
Bolling Oil, No. 1 Quinn, Jasmine, Kern	14-	25-	27	2,459	granite; abd.
Hast Oil, No. 9 Kern, Kern River, Kern	34-	28-	28	410	O.S. drlg.
Kern Hills Oil, No. 1 Brown, Kern River, Kern	27-	28-	28	443	O.S. drlg.
Jergins Oil, No. 5-A, McGowan, Edison, Kern	13-	30-	29	1,594	testing
Monterey Expl., No. 15 Shell-Duff, Edison, Kern	15-	30-	29	1,731	idle
Universal Cons'd. Oil, No. 3 Cattani, Arvin, Kern	15-	31-	29	6,168	O.S. drlg.
Western Gulf Oil, No. 45-B, KCL, Fruitvale, Kern	22-	29-	27	3,770	testing
Standard Oil, No. 5 Mushrush, Wasco, Kern		7-	27-24	10,410	sd. sh. drlg.
Pacific Western Oil, No. 1 Meyer, Wasco, Kern		7-	27-24	10,296	sd. sh. drlg.
General Pet., No. 5 Caldwell, Rio Bravo, Kern	35-	28-	25	8,962	sd. sh. drlg.
Union Oil, No. 56-34, KCL, Rio Bravo, Kern	34-	28-	25	10,670	sd. sh. drlg.
Union Oil, No. 63-34, KCL, Rio Bravo, Kern	34-	28-	25	11,230	O.S. drlg.
Union Oil, No. 65-34, KCL, Rio Bravo, Kern	34-	28-	25	3,967	sd. sh. drlg.
Superior Oil, No. 3-1 Osborn, Rio Bravo, Kern	28-	28-	25	11,493	flow 1,435 b.d.
Superior Oil, No. 2 Roe, Rio Bravo, Kern	27-	28-	25	9,550	sd. sh. drlg.
Superior Oil, No. 2 Rudnick, Rio Bravo, Kern	28-	28-	25	8,962	sd. sh. drlg.
Superior Oil, No. 1 Moore, Greeley, Kern	12-	29-	25	4,993	sd. sh. drlg.
Superior Oil, No. 1 Brandt, Greeley, Kern	28-	29-	26	10,540	hd. sh. drlg.
Standard Oil, No. 11-22, KCL, Greeley, Kern	18-	29-	26	10,498	sd. sh. drlg.
Standard Oil, No. 12-9, KCL, Greeley, Kern		7-	29-26	10,050	sd. sh. drlg.
Standard Oil, No. 12-10, KCL, Greeley, Kern		7-	29-26	8,792	sd. sh. drlg.
General Pet., No. 1 Wallace, Greeley, Kern		1-	29-25	7,162	sd. sh. drlg.
Shell Oil, No. 8-19-A, KCL, Ten Section, Kern	19-	30-	26	8,140	sd. sh. drlg.
Shell Oil, No. 21-30-A, KCL, Ten Section, Kern	30-	30-	26	7,080	sd. sh. drlg.

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
B. ck., bottom choke.
Br. sh., brown shale.
B.S., basic sediment.
C.&P., cellar and pits.
Cd. or Crd., cored.
C.D., correct depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg., or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.S.T., drill-stem test.
D.P., drill pipe.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe-line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Recvd., recovered.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtrk. or St., sidetracked.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel-line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas, and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T. ck., top choke.
T.P., tubing pressure.
Tr., tract.
Tstd., tested.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting on cement to set.
W.O.O., waiting on orders.
W.P., working pressure.
W.S.O., water shutoff.
W.S.O.O.K., water shutoff O.K.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

Shell Oil, No. 41-30-A, KCL, Ten Section, Kern	30-30-26	....	rigging up
Shell Oil, No. 61-30-A, KCL, Ten Section, Kern	30-30-26	6,253	sd. sh. drlg.
Shell Oil, No. 87-29-A, KCL, Ten Section, Kern	31-30-26	8,220	O.S. drlg.
Ohio Oil, No. 19-E, KCL, Canal, Kern	13-30-25	8,265	will P.B.
Richfield Oil, No. 16-28-A, KCL, Tupman, Kern	28-30-25	....	rigging up
Richfield Oil, No. 18-28-A, KCL, Tupman, Kern	28-30-25	8,435	O.S. drlg.
Richfield Oil, No. 36-26-A, KCL, Tupman, Kern	28-30-25	7,060	sd. sh. drlg.
Richfield Oil, No. 58-28-A, KCL, Tupman, Kern	28-30-25	8,760	sd. sh. drlg.
Richfield Oil, No. 78-30-A, KCL, Tupman, Kern	30-30-25	8,585	O.S. drlg.
Richfield Oil, No. 72-32-A, KCL, Tupman, Kern	32-30-25	8,440	sd. sh. drlg.
Richfield Oil, No. 14-33-A, KCL, Tupman, Kern	33-30-25	7,951	sd. sh. drlg.
Richfield Oil, No. 18-33-A, KCL, Tupman, Kern	33-30-25	9,140	sd. sh. drlg.
Richfield Oil, No. 34-33-A, KCL, Tupman, Kern	33-30-25	8,264	sd. sh. drlg.
Richfield Oil, No. 52-33-A, KCL, Tupman, Kern	33-30-25	7,998	sd. sh. drlg.
Richfield Oil, No. 54-33-A, KCL, Tupman, Kern	33-30-25	8,943	sd. sh. drlg.
Richfield Oil, No. 34-29-A, KCL, Tupman, Kern	29-30-25	8,480	sd. sh. drlg.
Richfield Oil, No. 38-29-A, KCL, Tupman, Kern	29-30-25	8,092	sd. sh. drlg.
Richfield Oil, No. 276-29-A, KCL, Tupman, Kern	29-30-25	9,125	flow 1,550 b.d.
Richfield Oil, No. 78-28-B, KCL, Cole's Levee, Kern	28-30-25	8,870	sd. sh. drlg.
Richfield Oil, No. 54-4-B, KCL, Cole's Levee, Kern	4-31-25	8,891	O.S. drlg.
Standard Oil, No. 20-6, KCL, Cole's Levee, Kern	9-31-25	8,660	hd. sh. drlg.
Ohio Oil, No. 9-F, KCL, Cole's Levee, Kern	3-31-25	8,694	sd. sh. drlg.
Foster, Robert, No. 1 Hollingsworth, Md.-Sun., Kern	22-32-23	2,302	sd. sh. drlg.
Texas Co., No. 40 Midway, Midway-Sunset, Kern	32-32-24	3,210	O.S. drlg.
Exeter Oil, No. 8 Murphy, Mdwy.-Sun., Kern	28-32-24	3,137	sd. sh. drlg.
Signal O. & G., No. 8 Kendon, Mdwy.-Sun., Kern	35-32-23	2,180	sd. sh. drlg.
Union Oil, No. 9 Lakeview, Midway-Sunset, Kern	25-12-24	2,738	fish liner
Honolulu Oil, No. 25-P, Buena Vista, Md.-Sun., Kern	10-32-24	3,330	sd. sh. drlg.
Republic Pet., No. 1 C. H., Midway-Sunset, Kern	18-32-23	2,465	P.B. 1,887
Ohio Oil, No. 43-3-B, KCL, Paloma, Kern	3-32-26	10,361	flow 1,900 b.d.
Western Gulf-Texas, No. 743-3-A, KCL, Paloma, Kern	3-32-26	10,706	testing
Richfield Oil, No. 1 Ranch, Tejon Ranch, Kern	2-10-19	6,688	hd. sd. drlg.
Richfield Oil, No. 2 KCL, Wheeler Ridge, Kern	28-11-20	4,294	hd. sd. drlg.
Erickson & Swanson, No. 2 Grav., Kingsburg, Fres.	22-16-22	1,398	hd. sh. drlg.
Logan, J. E., No. 44 Yearout, Cantua, Fresno	26-16-14	7,290	sd. sh. drlg.
Continental Oil, No. 1 Joint, Jacalitos, Fresno	4-22-16	2,985	sd. sh. drlg.
Jergins Trust, No. 1 Cheney, Panoche Creek, Fresno	29-14-13	9,225	P.B. 7,350
Texas Co., No. 1 S.P., Turk anticline, Fresno	23-17-15	10,116	P.B. 9,413
Shell Oil, No. 45-2, East Coalinga, Fresno	2-20-15	3,745	bailing
Standard Oil, No. 77-19-B fee, N.E. Coalinga, Fresno	19-19-16	7,351	sd. sh. drlg.
Standard Oil, No. 82-19-8 fee, N.E. Coalinga, Fresno	19-19-16	8,245	completing
Standard Oil, No. 86-19-B fee, N.E. Coalinga, Fresno	19-19-16	7,264	sd. sh. drlg.
Amerada Pet., No. 3-20-B Ewing, N.E. Coalinga, Fres.	20-19-16	5,872	sd. sh. drlg.
Amerada Pet., No. 38-9 S.P., N.E. Coalinga, Fresno	9-19-16	6,980	sd. sh. drlg.
Pure Oil, No. 44-30-B Schwinn, N.E. Coalinga, Fres	30-19-16	8,183	O.S. drlg.
Wilshire Oil, No. 62-30-B, N.E. Coalinga, Fresno	30-19-16	8,260	recmtd. 8,205
Union Oil, No. 55-18 Cook, N.E. Coalinga, Fresno	18-19-16	7,090	sd. sh. drlg.
Bandini Pet., No. 71-30-B, N.E. Coalinga, Fresno	30-19-16	8,182	sd. sh. drlg.
Lytle, R. S., Agent, No. 33-7-F, S.E. Coalinga, Fresno	7-20-16	6,460	br. sh. drlg.
Lytle, R. S., Agent, No. 68-15-F, S.E. Coalinga, Fres.	18-20-16	8,051	tested wet
Lytle, R. S., Agent, No. 77-18-F, S.E. Coalinga, Fres.	18-20-16	7,900	O.S. drlg.
Lytle, R. S., Agent, No. 82-18-F, S.E. Coalinga, Fres.	18-20-16	7,630	br. sh. drlg.
Texas Co., No. 5 Exeter, S.E. Coalinga, Fresno	6-20-16	6,991	sd. sh. drlg.
Univ. Cons'd. Oil, No. 72-24-C, S.E. Coalinga, Fresno	24-20-15	7,820	sd. sh. drlg.
Standard Oil, No. 68-13-C fee, S.E. Coalinga, Fresno	13-20-15	7,553	br. sh. drlg.
Standard Oil, No. 88-13-C fee, S.E. Coalinga, Fresno	13-20-15	7,790	O.S. drlg.
Standard Oil, No. 22-17-F fee, S.E. Coalinga, Fresno	17-20-16	7,725	br. sh. drlg.
Standard Oil, No. 1-19-F fee, S.E. Coalinga, Fresno	19-20-16	7,630	O.S. drlg.
Standard Oil, No. 51-19-F fee, S.E. Coalinga, Fresno	19-20-16	7,098	sd. sh. drlg.
Standard Oil, No. 62-19-F fee, S.E. Coalinga, Fresno	19-20-16	3,005	sd. sh. drlg.
Superior Oil, No. 5-B Cagle, S.E. Coalinga, Fresno	6-20-16	6,860	sd. sh. drlg.
Union Oil, No. 9 King, Kettleman N. Dome, Fresno	29-21-17	10,330	O.S. drlg.
K. N. D. A., No. 322-18-J, Kett. N. Dome, Fresno	18-21-17	9,960	hd. sh. drlg.
K. N. D. A., No. 23-20-J, Kett. N. Dome, Fresno	20-21-17	8,876	hd. sh. drlg.
K. N. D. A., No. 36-20-J, Kett. N. Dome, Fresno	20-21-17	9,460	sd. sh. drlg.
K. N. D. A., No. 58-18-Q, Kett. N. Dome, Fresno	18-22-18	6,378	sd. sh. drlg.
K. N. D. A., No. 27-26-Q, Kettleman N. Dome, Kings	26-22-18	6,793	sd. sh. drlg.
K. N. D. A., No. 58-26-Q, Kettleman N. Dome, Kings	26-22-18	8,294	hd. sh. drlg.
Standard Oil, No. 321-29-J, Kett. N. Dome, Fresno	29-21-17	10,550	sd. sh. drlg.
Standard Oil, No. 334-29-J, Kett. N. Dome, Fresno	29-21-17	9,970	sd. sh. drlg.
Tide Water A. O., No. 1 W. Slope, Pyrd. Hills, Kings	20-24-18	950	pump 10 b.d.
Tide Water A. O., No. 1 fee, Pyramid Hills, Kings	18-24-18	862	sd. sh. drlg.
Tide Water A. O., No. 35-22 Daniel, Trico, Tulare	22-24-23	8,492	sd. sh. drlg.
Cal. Fuel Oil, No. 3 Alberta, Huasna, San Luis Ob.	5-32-13	2,890	sd. sh. drlg.
Superior Oil, No. 1 Tar Spgs., Huasna, San Luis Ob.	24-32-14	2,490	sd. sh. drlg.

OKLAHOMA

Week Ended June 22

NORTHERN OKLAHOMA

Creek County

D. E. Demsey's No. 1 Marrs, NE NW SE Sec. 29-18-8. Drlg. 1,850 ft.

Indo Oil Co.'s No. 1 Slick, NW NW NW Sec. 1-16-9. S.O. 1,145-78 ft.; T.D. in Dtchr. 2,922 ft.; W.O.C.

Garvin County

Troup et al's No. 1 Bowie, NW NE SE Sec. 3-4-3. Hntn. 2,692 ft.; drlg. 2,725 ft.

Hughes County

Loual Drlg. Co.'s No. 1 Jackson, C SW NE Sec. 24-9-9. Drlg. 1,710 ft.

Walker et al's No. 1 Hawthorne, SW SW SE Sec. 19-7-10. Drlg. 660 ft.

Kay County

Alma Oil Co.'s No. 1 Gosting, SE cor. Sec. 14-27-2. Drlg. 3,704 ft.

Kingfisher County

Phillips Pet. Co.'s No. 1 Grape, C NW SE Sec. 30-18-5w. Layton 5,800 ft.; O.S.W. 4,146 ft.; Miss. 6,670 ft.; drlg. 7,040 ft.

Lincoln County

Anderson-Prichard's No. 1 Smith, SE SW NE Sec. 18-15-5. Hntn. 4,278 ft.; Vla. 4,417 ft.; Wlx. 4,480 ft. and 4,514 ft.; T.D. 4,530 ft.; P.B. 3,538 ft.; shot; 5,600,000 cu. ft. gas; no O. or W.

Logan County

Eason Oil Co.'s No. 1 Wells, NE NW NE Sec. 15-16-2w. Lytn. 4,274 ft.; Ckbd. 4,565 ft.; Miss. 5,400 ft.; Msnr. 5,515 ft.; S.S.O.&G.; Hntn. 5,527 ft.; S.S.O.; drlg. 5,666 ft.

Kerlyn Oil Co.'s No. 1 Cavanaugh, C W½ SW NW Sec. 1-15-4w. Miss. 6,105 ft.; Wdfd. 6,135 ft.; Hntn. 6,264 ft.; Vla. 6,404 ft.; Wlx. 6,551 and 6,711 ft.; T.D. 6,736 ft.; D.&A.

Noble County

Helmerich & Payne's No. 1 Fireshaker, SE SE NE Sec. 11-24-3. Simp. 3,960 ft.; Wlx. 3,965 ft.; sd. and S.S.O. 3,983 ft.; drlg. 4,040 ft.

Okfuskee County

Burke-Greis' No. 1 Dew, NE NE NE Sec. 9-12-9. Pure 1,810 ft.; drlg. 3,117 ft.

Texas Co.'s No. 1 Cowan, SW cor. Sec. 5-11-10. Drlg. 950 ft.

Oklahoma County

Continental Oil Co.'s No. 1 Renund, SE SE NE Sec. 26-14-4w. Drlg. 2,498 ft.

Osage County

Mid-Continent Pet. Corp.'s No. 1 Osage, NW NW NE Sec. 18-24-5. Drlg. 1,885 ft.

Olson et al's No. 1 Osage, CSL 8½ NE Sec. 26-26-4. Drlg. 3,042 ft.

Payne County

Allen et al's No. 1 Freeman, SW SW SE Sec. 24-19-5. Drlg. 2,745 ft.

Comoil-Haskins' No. 1 Meyer, NW SE SE Sec. 17-17-6. S.O. 2,894 ft.; T.D. 2,897 ft. in Prue; F. 24 B.O. and 750,000, cu. ft. gas; comp.

H. & H. Oil Co.'s No. 1 Linsenmeyer, SE SE SW Sec. 3-18-4. Drlg. 620 ft.

Summit Drlg. Co.'s No. 1 Arnold, NW NE NW Sec. 8-19-2. Drlg. 1,560 ft.

Pontotoc County

Kerlyn Oil Co.'s No. 1 Chism, NW SE SE Sec. 24-5-6. S.O. 1,940-70 ft.; T.D. 2,173 ft.; P.B. 1,975 ft.; F. est. 7,000,000 cu. ft. gas.

Morgan et al's No. 1 Brown, SW SW SE Sec. 30-3-5. Vla. 523 ft.; drlg. 896 ft.

Sandback et al's No. 1 Statler, NE cor. Sec. 26-5-6. T.D. 2,007 ft.; P.B. 1,903 ft.; F. 26 B.O. in 24 hrs.; est. 6,500,000 cu. ft. gas; tstg.

Pottawatomie County

J. F. Smith's No. 1-A McKnown, SE SW NW Sec. 25-8-4. Hntn. 4,045 ft.; drlg. 4,050 ft.

Thompson Bros.' No. 1 L. Truesdale, SE SE NW Sec. 31-8-5. Earls. 3,486 ft., Msnr. 4,119 ft.; Hntn. 4,121 ft.; Vla. 4,224 ft.; first Wlx. 4,349 ft.; S.S.O.; Drlg. 4,375 ft.

Seminole County

C. E. Davis' No. 1 Key, NE NE SE Sec. 4-11-8. Drlg. 2,376 ft.

Washita County

Continental Oil Co.'s No. 1 School ld., C NE Sec. 16-8-16w. Gr. wsh. 3,005 ft.; drlg. 7,241 ft.

KANSAS

Week Ended June 22 (Descriptions are East unless marked otherwise)

Barber County

Finston's No. 1 Pichner, CEL NE SW Sec. 24-16-11w. Drlg. 2,650 ft.

Sinclair-Prairie Oil Co.'s No. 1 Binning, C S½ SE SW Sec. 26-32-13w. Tpka. 3,045 ft.; Lans. 3,930 ft.; Miss. 4,430 ft.; Vla. 4,769 ft.; drlg. 4,828 ft.

Butler County

J. H. Wagoner's No. 1-A Ramsey, SW NW SE Sec. 8-24-5. Pay 2,088-93 ft.; T.D. 2,501 ft.; C.O.

Cowley County

Barwick & Sheridan's No. 1 Warren, C W½ NW NW Sec. 18-35-6. K.C. 2,675 ft.; Miss. 3,198-3211 ft.; T.D.; D.&A.

Foster Oil Co.'s No. 2 Howard, E½ SW SW Sec. 8-34-4. Miss. 3,329 ft.; Arb. 3,842-76 ft.; T.D. D.&A.

McKnab's No. 1 Lemert, CWL NW SE Sec. 11-34-4. Drlg. 2,750 ft.

McKnab's No. 1 Snyder, C W½ NW NW Sec. 15-34-3. Bart. 3,270-80 ft.; Miss. 3,291 ft.; Pot. 231 B.O.

Markey et al's No. 1-A Hunt, SW SW NE Sec. 16-34-5. Drlg. 3,017 ft.

I. W. Murfin's No. 1 Jarvis, N½ SW NE Sec. 19-31-5. Drlg. 2,540 ft.

E. B. Shawver's No. 1-B Widener, C S½ SE NW Sec. 11-30-4. Miss. 2,825-40 ft.; Arb. 3,226 ft.; 1½ B.O.P.H.; T.D. 3,245 ft.; inc. wtr. D.&A.

Stewart et al's No. 1-A Ehmke, C W½ NW NW Sec. 14-32-3. Drlg. 1,965 ft.

Trees Oil's No. 1 Orr, NW NE NW Sec. 17-30-4. Drlg. 505 ft.

Douglas County

Forrester et al's No. 1 Altenbernd, CSL NW Sec. 35-12-20. Drlg. 275 ft.

Kerlyn Oil Co.'s No. 1 Whedon, C NE NE Sec. 20-13-20. Drlg 60 ft.

Ellis County

Gulf et al's No. 1 Sander, CWL SW SE Sec. 30-13-16w. Tpka. 2,940 ft.; Arb. 3,450 ft.; P. 204 B.O. and 121 B.W. in 21 hrs. Comp.

Ellsworth County

Cities Service's No. 1 Kanak, SW cor. Sec. 12-16-8w. Tpka. 2,160 ft.; Lans. 2,501 ft. Arb. 2,952 ft. T.D. 2,970 ft.; D.&A.

Emerich et al's No. 1 Hagy, C W½ SW NE Sec. 20-16-10w. Drlg. 2,745 ft.

Finston et al's No. 1 Siemsen, C W½ NW SE Sec. 3-17-10w. Lans. 2,925 ft.; K.C. 3,200 ft.; Arb. 3,375-90 ft.; T.D.; D.&A.

Palmer Oil Corp.'s No. 1 Stratman, C E½ NE SW Sec. 15-17-10w. Drlg. 2,325 ft.

Kearny County

Stanolind O. & G. Co.'s No. 1 Judd, C SE SE Sec. 15-21-38w. Drlg. 3,680 ft.

McPherson County

Bay Pet. Co.'s No. 1 Coons, C W½ SW SW Sec. 13-19-1w. Lans. 2,312 ft.; Miss. 2,906 ft.; T.D. 2,925 ft.; 2,000,000 cu. ft. gas; S.W. & S.S.O.; R.U.R.

Broadwater, Inc.'s No. 1 Heaton, C E½ SE SE Sec. 28-17-1w. U.R. 1,630 ft.

H. & M. Drlg. Co.'s No. 1 Swenson, S½ SW NE Sec. 9-18-4w. Miss. 3,021 ft.; drlg. 3,193 ft.

Westgate-Greenland's No. 1 Lassen, CSL NW SE Sec. 24-17-2w. Drlg. 792 ft.

Marion County

H. H. Royer's No. 1 Kroch, NE NE NW Sec. 28-18-4. O.T.D. 2,452 ft.; T.D. 2,510 ft.; to P.B.

Pawnee County

Magnolia's No. 1 Smith, CEL NE NE Sec. 12-21-16w. Lans. 3,412 ft.; Vla. 3,694 ft.; Simp. sh. 3,722 ft.; Arb. 3,764 ft.; T.D. 3,787 ft.; D.&A.

Rooks County

Mitchell Drlg. Co.'s No. 1 Vererka, CSL SE SE Sec. 21-8-19w. Tpka. 2,783 ft.; Lans. 3,174 ft.; S.S.O. 3,174 ft.; drlg. 3,257 ft.

Aylward Prod. Co.'s No. 1 Richards, C N½ NW SW Sec. 31-10-18w. Loc.

Wakefield et al's No. 1 Diehle, C N½ NW NW Sec. 4-9-17w. Tpka. 2,885 ft.; drlg. 2,910 ft.

Russell County

Gussman's No. 1 Mudd, CWL NW NE Sec. 16-15-15w. Drlg. 1,900 ft.

Haynes et al's No. 1 Driscoll, CNL SE SW Sec. 30-15-11w. Tpka. 2,685 ft.; drlg. 2,930 ft.

Jones Bros.' No. 1 Mahoney, CSL SW SW Sec. 8-14-12w. T.D. 2,408 ft.; est. 1,000,000 cu. ft. gas.

Pryor & Lockhart's No. 1 Davidson, C E½ NE NW Sec. 12-15-11w. Drlg. 405 ft.

MISSOURI

Adair County

Eddington et al's No. 1-A Clark, NE NE SE Sec. 8-63-14w. Miss. 310 ft.; Hunton 739 ft.; Vla. 970 ft.; St. P. 1,135 ft.; S.D. 1,150 ft.

Eddington-McAlpin's No. 1 Johnson-Capps, SW SW Sec. 31-64-15w. Drlg. 930 ft. in Hntn.

DeKalb County

American O. & G. Co.'s No. 1 Thompson, SW SW Sec. 30-58n-31w. Drlg. 600 ft.

Knox County

Harris & Holmes' No. 1 Newkirk, NE NE Sec. 11-61-11w. S.D. 60 ft.

Platte County

Roach-Vincent et al's No. 1 Dillingham, C NE SW Sec. 16-53-34w. Miss. 1,063-1,445 ft.; Hntn. 1,475 ft; T.D. 1,485 ft.; D.&A.

NEBRASKA

Pawnee County

Blaser & Hoerman's No. 1 Wilson, NE NW NW Sec. 4-1-10. S.S.O. 470-71 ft.; T.D. 600 ft.; S.D.

Richardson County

Pawnee Royalty Co.'s No. 1 Boice, CSL N½ NE NE Sec. 18-1n-16e. O.W.D.D.; Vla. 2,911 ft.; Arbuckle 3,268-3,300 ft., T.D.; P.B. 2,286 ft.; F. 1½ B.O.P.H. through H.F.W.

Uhri Oil Co.'s No. 1 Ogle, NE NW SE Sec. 9-1n-14e. Cg. 2,250 ft.

ARKANSAS

Columbia County

Barnsdall Oil Co.'s No. 1 El Dorado & Wesson R. R. Co., C NW SW Sec. 5-19-18. Set 10¾-in. csg. 2,525 ft.; drlg. rd. sdy. sh. 7,115 ft.

Mid-Continent Pet. Corp.'s No. 1 J. Keith, C SW NW Sec. 16-18-22. Set 16-in. csg. 397 ft.; set 9⅝-in. csg. 4,144 ft., drlg. rd. sdy. sh. 7,051 ft.

Placid Oil Co.'s No. 1-B J. W. Booth, C SE SE Sec. 19-17-19. Set 13⅜-in. csg. 135 ft.; drlg. rd.&gr. sh. 5,677 ft.

Southwood Oil Co.'s No. 2 H. C. Couch, C S½ SW SW and S½ SE SW Sec. 28-17-20. T.D. 7,643 ft.; flwg. 10 B.P.H., ¼-in. ck.; using gas pressure from No. 1 Couch.

Standard Oil Co. of La.'s No. 3-B Longino, 660 ft. W, 560 ft. S, NE cor. SW SE Sec. 18-17-19. Set 9⅝-in. csg. 2,171 ft.; W.O.C. 2,175 ft.

Standard Oil Co. of La.'s No. 1 Merritt et al unit, Sec. 16-17-20. Set 13⅜-in. csg. 224 ft.; drlg. sd. & sh. 6,048 ft.

Tide Water Asso. Oil Co.'s No. 3 J. T. Beene, C SW NE Sec. 15-18-19. Partly R.U. and S.D.

Dallas County

H. H. McBride et al's No. 1 Southern Kraft Corp., C SE SW Sec. 16-2-16. R.U.; W.O.

Lafayette County

East Texas Ref. Co.'s No. 2 Bodcaw Lbr. Co., 530 ft. S, 660 ft. E, NW cor. NE NE Sec. 19-18-23. Set 10-in. csg. 130 ft.; drlg. 2,240 ft.

J. & J. Oil Co.'s No. 1 J. E. Barnes, 345 ft. W, 615 ft. N, SE cor. Sec. 4-16-24.

Set 10¾-in. csg. 218 ft.; T.D. (cor.) 2,160 ft.; S.D.

Faulkner County

Cato Oil Co., Inc.'s No. 1 R. R. Harrell, 330 ft. SE cor. SE SW Sec. 35-4n-12w. T.D. 2,438 ft.; U.R. csg. and set 7-in. csg. 2,370 ft.; S.D.W.O. 2,770 ft.

Lonoke County

Lunnon Howell & Ford's No. 1 City of Cabot, C NE Lot 1, Blk. 6, Sec. 18-4n-9w. Set 4¾-in. csg. 878 ft.; drlg. 1,259 ft.

J. F. Russell's No. 1 J. T. Gunter, 440 ft. N, 577 ft. W. SE cor. Sec. 17-5n-10w. Drld. sd. S.S.O. 2,231-45 ft.; drlg. 2,367 ft. (cor.).

Miller County

Standard Oil Co. of La.'s No. 2 W. P. Sturgis, 330 ft. SE cor. NE SW Sec. 1-17s-27w. R.U.

Saline County

Tedford Drlg. Co. et al's No. 1 Cunningham, C SW NE Sec. 31-3s-15w. Set 12½-in. 75 ft.; reported S.D. 155-162 ft.; S.D. 212 ft.

Union County

J. H. Coker and J. P. Grieves et al's No. 1 C. L. Smith, 330 ft. SW cor. NE NW Sec. 32-17-14. Set 10¾-in. csg. 225 ft.; drlg. sdy. sh. 2,890 ft.

Fohs Oil Co.'s No. 1-A Grace, 660 ft. N, 330 ft. W, SE cor. SW SE Sec. 31-17-14. Sqzd. perf. 2,732-38 ft. and reperf. 2,732-37 ft. and tstd. 90 ft. oil and 2,200 ft. brackish wtr.; sqzd.; W.O.C.

Marine Oil Co.'s No. 6-B Thompson, 350 ft. N, 200 ft. W, SE cor. SE SW Sec. 3-18-13. T. Urbana sd. 3,520 ft. D.S.T. 3,057-77 ft.; tstd. drlg. fluid and S.W.; set 7-in. csg. 3,521 ft.; T.D. 3,553 ft.

Phillips Pet. Co.'s No. 1 C. H. Murphy, 165 ft. S, 10 ft. E, NW cor. S½ Lot 2 NW Sec. 19-18-17. T. Jones sd. 7,590 ft.; prep. run 7-in. csg. 7,690 ft.

Standard Oil Co. of La.'s No. 1 D. A. Zimmerman, 660 ft. SE cor. SE SE Sec. 29-18s-16w. Set 13⅜-in. csg. 227 ft.; drlg. hd. sdy. sh. 6,257 ft.

Phillips Pet. Co.'s No. 1 Miami Corp., Sec. 11-4s-6w. Well tried to blow out; stk. D.S.; sdtrkd. 3,775 ft.; 9⅝-in. csg 9,583 ft.; T.D. 10,655 ft.; will run short string of csg. to test gas sd. 10,196-10,207 ft.

Superior Oil Co.'s No. 3 State, Sec. 1-14s-9w. Drlg. sh. 8,456 ft.

Iberville Parish

Falcon-Seaboard's No. 1 Folse, Sec. 11s-13e. 13⅜-in. csg. 2,335 ft.; drlg. sh. 6,676 ft.

Jeff Davis Parish

H. M. Naylor's No. 1 Acadia Dev. Co., Sec. 12-10s-2w. 10¾-in. csg. 2,115 ft.; 9⅝-in. csg. 9,006 ft.; T.D. 10,000 ft.; 7-in. csg. 10,000 ft.; perf. csg. 9,700-11 ft.; flwd. 5 bbl. 43-gr. dist. and 2 bbl. S.W. per hr.; ⅛-in. ck.; killed well.

Jefferson Parish

Shell Oil Co., Inc.'s No. 1 State, Sec. 27-20s-24e. M.I.R.

Vendome Pet. Co.'s No. 1 Coulon, Sec. 15-15s-23e. T.D. 10,607 ft.; abd.

La Fourche Parish

Gulf Oil Corp.'s No. 1-B Bowie Lbr. Co., Sec. 69-15s-19e. T.D. 12,512 ft.; perf. csg. 12,230-40 ft.; rec. S.W.; made squeeze job; prep. to retest.

Plaquemines Parish

Gulf Oil Corp.'s No. 1-E Buras Lv. dist., Sec. 1-23s-10e. T.D. 9,287 ft.; 9⅝-in. csg. 9,269 ft.; drlg. sh. 9,467 ft.

California Co.'s No. 1 Delta Minerals, Sec. 2-15s-24e, 13⅜-in. csg. 2,028 ft.; T.D. 10,246 ft.; 7-in. csg. 10,188 ft.; perf. csg. 9,960-63 ft.; flwg. 75 B.P.D. fluid; 1 to 50% S.W.; W.P. 750 lb.

St. Charles Parish

Celestine Oil Co.'s No. 1 Celestine plantation, Sec. 17-11s-4e. S.D. 1,250 ft.

St. Mary Parish

E. G. Bateman et al's No. 1 W. P. Foster, Sec. 38-15s-9e. Bldg. rd.

Sun Oil Co.'s No. 1 Belle Isle, Sec. 6-18s-11e. T.D. 7,408 ft.; P.B.; sdtrkd.; drlg. 7,271 ft.

Terrebonne Parish

Stanolind O. & G. Co.'s No. 1 State (Bay Junop), Sec. 35-21s-14e. 20-in. csg. 95 ft.; drlg. sh. 1,830 ft.

Vermilion Parish

I. Delcambre's No. 1 Renard, Sec. 17-13s-5e. T.D. 696 ft.; abd.

Union Oil Co. of Calif.'s No. 1 Walter White hrs., Sec. 17-15s-1e. 13⅜-in. csg. 2,800 ft.; T.D. 10,395 ft.; P.B.; sdtrkd.; drld. to 10,277 ft.; 7-in. csg. 10,267 ft.; drlg. sdy. sh. 10,736 ft.

LOUISIANA

NORTH LOUISIANA

Bienville Parish

Ark.-La. Gas Co.'s No. 1-C Thomas, 710 ft N, 1,273 ft. E, SW cor. NW Sec. 24-16-10. R.U.

Union Prod. Co.'s No. 1 Havis Unit, 150 ft. N and W of SE line NW NW Sec 11-16-10. R.U.

Bossier Parish

R. L. Reese et al's No. 1 Bellevue Ld. Co., 170 ft. E, 365 ft. N, C Sec. 27-20-11. Set 10-in. csg. 100 ft.; drlg. sh. 1,583 ft.

Triangle Drlg. Co.'s No. 6-C Skannal, 1,002 ft. W, 332 ft. S, NE cor. Sec. 13-17-12. Set 5½-in. csg. 3,004 ft.; T.D. 3,010 ft.

Caddo Parish

W. F. Bridewell's No. 1 Stiles, Sec. 21-21-16. W.O.S.R. 2,400 ft.

Chastain & Meier's No. 1 Crystal fee, Sec. 24-21-16. R.U.

J. M. Conner's No. 1-A Williams, 334 ft. N, 986 ft. W, SE cor. NE Sec. 3-15-15. Set 10¾-in. csg. 400 ft.; W.O.C.

L. O. Gandy's No. 2 Etchison, Sec. 11-20-16. Set 6⅝-in. csg. 1,386 ft.; W.O.C.

L. Halbfass' No. 1-B Knight Oil & Ld. Co. Sec. 1-21-16. Set 10-in. csg. 60 ft.; drlg. 1,863 ft.

F. G. Holcomb's No. 1 Sims, Sec. 3-20-16. Set 10-in. csg. 75 ft.; rng. csg. 1,000 ft.

Juan & McFatrick's No. 2-A Hobbs, Sec. 28-21-15. Drlg. sh. 307 ft.

McDonald & Campbell's No. 16 Youree, Sec. 13-20-15. R.U.

Magnolia Pet. Co.'s No. 22 Doan-Thigpen, Sec. 6-20-15. Tstg. 1,515 ft.

R. L. Milam's No. 2 Bickham, Sec. 28-21-15. R.U.

M. L. Miller's No. 1 Muslow, Sec. 31-21-15. Drlg. sd.&sh. 1,320 ft.

G. H. Neighbors' No. 1 Richardson, Sec. 36-21-16. Set 6⅝-in. csg. 1,335 ft.; T.D. 1,420 ft.; W.O.C.

Oil & Gas, Inc.'s No. 3 Stiles, Sec. 28-21-16. Set 10-in. csg. 84 ft.; W.O.C.

Sklar Oil Corp.'s No. 2 Cheshire, Sec. 32-21-15. Set 6⅝-in. csg. 1,330 ft.; W.O.C. 1,597 ft.

Skibro Co.'s No. 1 Shreveport Pet. Co., Sec. 2-20-16. Set 6⅝-in. csg. 1,395 ft.; T.D. 1,542 ft.; W.O.C.

Stanolind O. & G. Co.'s No. 133 Dillon, Sec. 13-21-15. Set 5½-in. csg. 1,492 ft.; acd.; T.D. 1,650 ft.

Stanolind O. & G. Co.'s No. 1 R. T. Glassell, Sec. 25-21-15. Set 5½-in. csg. 1,421 ft.; T.D. 1,590 ft.; acd.; W.O.S.R.

Stanolind O. & G. Co.'s No. 2 Noel est., Sec. 25-21-15. Set 8⅝-in. csg. 71 ft.; W.O.C.

J. G. Strahan's No. 4-A Stiles, Sec. 29-21-16. Set 5½-in. csg. 2,202 ft.

Texas Co.'s No. 10 J. F. Herndon, Sec. 14-21-15. Set 6⅝-in. csg. 1,484 ft.; acd. with 4,000 gal.; pmpg. S.W.; S.O. 1,672 ft.; tstd. S.W.; recmtg. csg.

Texas Co.'s No. 12-A Herndon, Sec. 14-21-15. Set 6⅝-in. csg. 1,504 ft.; W.O.C. 1,669 ft.

Texas Co.'s No. 1 La. Co. fee, Sec. 1-20-16. T.D. 1,672 ft.; tstd. S.W. 1,473 ft.; set short string 5-in. csg. 1,508 ft.; tstd. S.W.; S.O.; T.D. 1,672 ft.; attempting cmt. off S.W.

Tiger O. & G. Co.'s No. 1-B Crystal fee, Sec. 24-21-16. Set 8-in. csg. 988 ft.

Sloan Wells' No. 2 Stiles, Sec. 32-21-16. Set 10-in. csg. 40 ft.; tstg. 2,404 ft.

R. W. Williams' No. 4 Ark. Fuel Oil, Sec. 25-21-16. Tstd. S.W. 2,290 ft.; W.O.

W. & W. Oil Co.'s No. 1 Guy, Sec. 12-20-16. Drlg. sh. 1,100 ft.

Catahoula Parish

Continental Oil Co.'s No. 1 Tensas, C N½ SW SW Sec. 12-9-7e. Set 10¾-in. csg 1,120 ft.; drlg. sh.&L. 8,795 ft.

Claiborne Parish

Ohio Oil Co.'s No. 15 G. W. Taylor Acct 1, 100 ft. S and W, C SE Sec. 15-23-8 Set 13⅜-in. csg. 980 ft.; T. James l. 4,789 ft.; cd. L., S.W. 4,789-4,811 ft.; T. Pett. L. 5,206 ft.; D.S.T. 5,208-31 ft.; ⅝-in. cks. T.&B.; tool open 28 min.; no W.P.; rec. 3¼ jts. mud cut with oil; set 9⅝-in. csg. 5,970 ft.; drlg. red sh. 6,173 ft.

Franklin Parish

J. B. White et al's No. 1 Dailey, 1,170 ft. N, 2,490 ft. W, SE cor. Sec. 1-11-6e. Drlg. sh. 2,063 ft.

Grant Parish

Peterson Pet. Corp.'s No. 1 Swope, 182 ft. N, 85 ft. W, SE cor. NW SE Sec. 18-9-1e. Set 10-in. csg. 100 ft.; W.O.C.

La Salle Parish

Ark. Fuel Oil Co.'s No. 2-A Goodpine, 608 ft. N, 667 ft. W, SE cor. SW Sec. 7-20-3e. T.D. 2,239 ft.; sqzd. perf. and reperf. 2,228-32 ft.; tstd. est. 5,000,000 cu. ft. gas; killed and sqzd. off.

Coon & Ezell's No. 1 Herring, 300 ft. W, 150 ft. S, NE SE SW Sec. 1-8n-3e. T.D. 2,335 ft.; perf. 2,212-16 ft. and 2,228-32 ft.; S.D.

La Salle Asso., Inc.'s No. 1 fee, 205 ft. N, 30 ft. W, SE cor. SW SW Sec. 19-10-2e. Set 7-in. csg. 1,580 ft.; W.O.C.

Peterson Pet. Corp.'s No. 1 Tremont Lbr. Co., C NE SW Sec. 25-9-2e. R.U.

Placid Oil Co.'s No. 6 Goodpine, C NE SW Sec. 18-10-3e. T. Wilcox 1,624 ft.; oil sd. 2,233-49 ft.; S.W. sd. 2,259-69 ft.; perf. 2,230-45 ft.; tstg. 7-in. csg. set at 2,426 ft.; T.D. 2,428 ft.

Placid Oil Co.'s No. 17 La. Central, C NW SE Sec. 19-11-3e. T. Wix. 1,590 ft.; cd. 2,200-2,410 ft.; all sds.; S.W.; tstd. dry 4,950-80 ft.; drlg. 5,013 ft.

Placid Oil Co.'s No. 19 La. Central, C NE NW Sec. 36-10n-2e. Drk.

R. E. Trichel's No. 1 Doughty, 100 ft. NW cor. SE NW Sec. 36-10-1e. Set 10-in. 100 ft.; W.O.C.

G. W. Ziegen's No. 17 La. Central, C NW NE Sec. 36-11-2e. Cg. 1,611 ft.

Morehouse Parish

Southern Carbon Co.'s No. 31 Tensas, Sec. 2-21-4e. Set. 6-in. csg. 2,142 ft.; W.O.C.

Sabine Parish

Ed Bailey's No. 1 Hale, 330 ft. NW cor., NE NW Sec. 6-7-12. S.D. 2,197 ft.

Major Oil Co.'s No. 1 Laroux, 330 ft. NE cor. SE NE Sec. 36-8-13. Set 7-in. csg. 2,215 ft. W.O.C.

Geo. L. Pace's No. 5 DeSoto, 330 ft. NE cor. SE Sec. 27-10-13. Drlg. sh. 457 ft.

Shell Oil Co., Inc.'s No. 1 Pickering Lbr. Co., C NE SW Sec. 30-4-12. R.U.

Webster Parish

W. C. Feazel's No. 1 Tillman, 1,320 ft. NW cor. NE Sec. 11-17-9. Spdg.

Hunt Oil Co.'s No. 2 Scott, 1,980 ft. N. 50 ft. E, SW cor. Sec. 20-21-9. Set 13⅜-in. csg. 610 ft.; drlg. L.&sh. 6,127 ft.

Hunt Oil Co.'s No. 6 E. L. Stewart, 200 ft. NW C NE SE Sec. 30-21-10. Set 9⅝-in. csg. 5,606 ft.; drlg. sd.&sh. 7,957 ft.

Midstates Oil Corp.'s No. 1 Giddens unit 282 ft. N and W. C SW NE Sec. 30-21-9. Set 13⅜-in. csg. 667 ft.; fsg. 5,487 ft.

S. LOUISIANA WILDCATS

Acadia Parish

Vincent & Welch et al's No. 1 R. McManus, Sec. 21-7s-1w. T.D. 3,537 ft.; 6-in. csg. 3,536 ft.; flwg. est. 15 bbl. 28-gr. oil and 2,000,000 cu. ft. gas per day; ½-in. ck.

Assumption Parish

Shell Oil Co., Inc.'s No. 1 A. L. Patereau Unit 1, Sec. 66-16s-14e. T.D. 11,278 ft.; abd.

Beauregard Parish

Danciger O. & R. Co.'s No. 1 G. E. Leroy, Sec. 2-3s-9e. 10¾-in. csg. 2,048 ft.; cg. sh. 7,565 ft.

Calcasieu Parish

G. E. Burford et al's No. 1 La. Farm & Livestock Co., Sec. 7-11s-9w. Loc.

W. T. Burton et al's No. 1 Mayo Realty Co., Sec. 8-11s-8w. Drlg. sh. 1,934 ft.

Hamman Expl. Co.'s No. 1 Sabine Rice Ld., Inc., Sec. 3-11s-11w. Loc.

Cameron Parish

M. H. Hennah's No. 1 J. S. Reed, Sec. 18-10s-12w. Drlg. sh. 2,001 ft.

TEXAS

Week Ended June 22

GULF COAST WILDCATS

Brazoria County

Glenn McCarthy's No. 1 W. B. Munson, Samuel Carter Sur. Cg. 11,710 ft.

Rowan & Nichols Oil Co.'s No. 1 Hubbard, Wm. Harris Sur. 10-min. D.S.T. 9,107-34 ft.; rec. 128 ft. mud and dist.; T.D. 10,008 ft.; 7-in. csg. 9,680 ft.

Chambers County

Humble O. & R. Co.'s No. 1 State, Sec. 247, Galveston Bay. T.D. 9,225 ft.; run electrical survey.

Sun Oil Co.'s No. 1 Clara C. Smith, T.& N.O. Sur. 82. T.D. 8,865 ft.; W.O.C.

Colorado County

R. O. Lowrence's No. 1 Ackley et al, W. L. Platt Sur. Loc.

Shell Oil Co., Inc.'s No. 1 R. H. Goodrich, H. Heller Sur. Drlg. sh.&L. 6,883 ft.

Fort Bend County

Superior Oil Corp.'s No. 2 A. P. George, A. B. Keller Sur. 10¾-in. csg. 1,816 ft. drlg. sh. 6,676 ft.

Harris County

Christian-Carpenter Drlg. Co.'s No. 1 Anderson, J. C. Anderson Sur. 10¾-in. csg. 810 ft.; T.D. 6,470 ft.; P.B.; sdtrkd.; cg. 6,806 ft.

Wm. Hobson's No. 1 N. N. Allen, Blk. 12, Geo. Green Sur. 10¾-in. csg. 725 ft.; T.D. 7,704 ft.; made D.S.T.; perf. csg. 6,918-26 ft.; flwg. gas and dist.

Jackson County

W. S. Boyle's No. 1 Beenview Dev. Co., V. Garcia Sur., Blk. 35. Drlg. sh. 4,120 ft.

John Mayo and Kirkpatrick Drlg. Co.'s No. 1 J. H. Tucker, R. Musquez Sur. 10¾-in. csg. 505 ft.; drlg. sh. 5,414 ft.

Matagorda County

Texas Co.'s No. 1 A. B. Pierce, H.&G. N. Sur., Sec. 1, Blk. 65. T.D. 8,971 ft.; perf. csg. 8,290-8,300 ft.; flwd. some dist.; 500 lb. W.P.

Texas Co.'s No. 2 R. V. Taylor, F. George Sur. Drlg. sh. 7,890 ft.

San Jacinto County

Shell Oil Co., Inc.'s No. 1 Coldine, J Rankin Sur. Rec. 9 B.O. and 9 bbl. S.W.; D.S.T. 7,815-7,790 ft.; T.D. 10,002 ft.; W.O.

Wharton County

Eura B. Oil Co.'s No. 1 Maerz, John T. Rives Sur., Sec. 64. Drlg. sh. 3,360 ft.

Magnolia Pet. Co.'s No. 2 A. P. Borden, E. M. Coy Sur. T.D. 5,070 ft.; abd.

S. W. TEXAS WILDCATS

Aransas County

Continental Oil Co.'s No. 2 St. Charles Co., R. D. Blassman Sur.; (relief well to blow out); T.D. 8,406 ft.; perf. csg. 8,340-8,400 ft.; pmpg. in wtr.

Bastrop County

August Bering's No. 1 Rivers, B. Osborne Sur. S.D. 2,815 ft.

C. R. Franklin's No. 1 Oscar McDonald, Martha Baker Sur. T.D. 2,232 ft.; 5½-in. csg. 1,500 ft.; abd.

W. C. McGlothlin et al's No. 1 Bill. Albert Black Sur. 5½-in. csg. 3,143 ft.; rec. small amt. of oil.; T.D. 3,196 ft.; swbd. oil and sulfur wtr.; W.O.

Bexar County

H. L. Bedwell's No. 1 Russell F. Rodriguez Sur. Drlg. 150 ft.

C. G. Bigby's No. 1 Mauermann, Fernando Rodrigues Sur. T.D. 480 ft.; T.A.

Roger Putnam's No. 1 Conaway, John H. Lucas Sur. 54. T.D. 810 ft.

Jos. Turner et al's No. 1 John Brown, T. H. Hobbs Sur. 357. T.D. 4,023 ft.; D.S.S.

Brooks County

Sun Oil Co.'s No. 1-A Charles Boedecker, Sec. 16, C.C.S.D.&R.G.N.G. Sur. Loc.

Caldwell County

Kean & Williamson's No. 1 E. E. Rector, J. Roberts Sur. T.D. 1,897 ft.; 6⅝-in. csg. 1,732 ft.; swbg.

Weygand Bros.' No. 1 W. C. Hill, John D. Rains Sur. Drlg. 780 ft.

Calhoun County

Coronado Corp.'s No. 1 K. Welder, Hidalgo Sur., 3 mi. SE Seadrift. "Tight well"; reported to be tstg.; 5½-in. csg. 9,750 ft.; perf. csg. 8,473-84 ft.; swbd. S.W.; perf. csg. 8,260-80 ft.

Cameron County

Sal Vieja Oil Co. et al's No. 1 Garcia, Santa Isabel gr. 8⅝-in. csg. 8,322 ft.; T.D. 10,307 ft.; set 471 ft. of 5-in. lnr. 8,603 ft.; perf. csg. 8,492-98 ft. and 6,730-40 ft.; rec. S.W.; rec. S.W. on series of D.S.T. 5,444-3,450 ft.; abd.

Duval County

Diamond-Half Oil Corp.'s No. 1 Cantu, Ponciano Alanis Sur. Drlg. 1,550 ft.

Forest Dev. Corp.'s No. 1 Rogers, J. Potevent Sur. 275. Loc.

Frank Frohnoefer's No. 1 V. Carrillo, A. Cantus Sur. Cg. sdy. sh. 4,828 ft.

Henderson Coquat's No. 1-B Southland Life Ins. Co., Santos Flores gr. Drlg. 1,560 ft.

Magnolia Pet. Co.'s No. 1 Sinclair hrs., F. C. and C. K. Gravis Sur. 510. Drlg. 2,730 ft.

Goliad County

J. K. Culton's No. 1 S. E. Cole, Goliad Town Tr. Spd.

New MAC
PLUNGER BARREL
for 2-inch tubing

Outlasts three ordinary barrels, as Steel Plunger works in and out of Cast Iron Barrel as much as 2 feet on the up and down stroke and more if desired, thus flushing itself free of sand or gypsum.

Reversible Valve Body and Plunger make for lowest upkeep.

Furnished with 2-Cup Standing Valve and with, or without, Garbutt Rod.

Save, with the New "MAC"!

Ask for complete details and price list.

McGREGOR
WORKING BARREL COMPANY
Bradford, Pa., U.S.A.

Tom Graham Oil Co.'s No. 1 R. H. Wood, D. Morris Sur. T.D. 5,235 ft.; abd.

Jim Hogg County

Humble O. & R. Co.'s No. 3 Mestena O. & G. Co., San Antonio de Baluarte gr., Sec. 392. T.D. 5,115 ft.; S.D.

Patel Drillers, Inc., et al's No. 1 Gutierez, E. C. Barton Sur. 579.

R. A. Welch's No. 2 Hachar, Sur. 266. 10¾-in. csg. 105 ft.; T.D. 3,115 ft.; abd.

Jim Wells County

Henshaw Bros.' No. 1 L. L. Allen, Casa Blanca Sur. 10¾-in. csg. 648 ft.

Hewitt & Daugherty's No. 1 Carver, I.& G.N.R.R. Sur. Drlg. 4,996 ft.

H. H. Howell's No. 1 San Antonio Joint Stock Ld. Bnk., Lopez gr., Sec. 9, Blk. 14. T.D. 6,556 ft.; 5½-in. csg. 5,740 ft. perf. csg. 5,651-57 ft.; rec. S.W.; abd.

Karnes County

Jack Frazier's No. 1 Cochran, Daniel B. McConnell Sur. T.D. 3,074 ft.; abd.

Kimble County

Austin Bridge Co.'s No. 1 Wilkinson, Brooks & Burleson Sur. T.D. 823 ft.; jnkd. & abd.

Austin Bridge Co.'s No. 1-A Wilkinson, Brooks & Burleson Sur. R.U.

J. C. Renfro's No 1. D. C. Morales, Hrs. of H. Grote Sur. 423. Drlg. L. 1,863 ft.

Schwab-Carlyle & Auld's No. 1 Baker, F. C. Stisser Sur. S.D. 1,716 ft.

Kleberg County

Skelly Oil Co.'s No. 1 State, Laguna de Los Olmos gr., Tr. 385. 7⅝-in. csg. 7,669 ft.; T.D. 9,429 ft.; perf. csg. 7,459-60 ft.; flwd. 120 B.P.D. fluid, 80% S.W.; squeezed perf.

La Salle County

H. R. Cullen's No. 1 A. L. Washburn, H. &G.N. Sur. 67. Rec. 150 ft. gas-cut mud; S.O.; D.S.T. 4,740-4,805 ft.; T.D. 6,950 ft.; fsg.

Live Oak County

Luling O. & G. Co.'s No. 2 Northern Royalty Corp., G.H.&H. Sur. 1. Drlg. 1,560 ft.

McMullen County

H. F. Baker's No. 1 Galloway, G. R. Galloway Sur. 34. S.D. 550 ft.

Cities Service Oil Co.'s No. 1 H. W. Rhode, Seale & Morris Sur. 13. Drlg. sh. 2,520 ft.

Medina County

G. R. and L. J. Dorsey's No. 1 Robertson, John George Sur. T.D. 310 ft.; abd.

Nueces County

Forrest Dev. Corp.'s No. 1 Merritt, L. I. Mfg. Co. Sur., Sec. 160. Drlg. sh. 4,539 ft.

Humble O. & R. Co.'s No. 1 State, Nueces Bay, Tr. 723, 10¾-in. csg. 1,712 ft.; cd. gas sd. 3,978-4,022 ft.; T.D. 5,200 ft.; W.O.C.

Pure Oil Co.'s No. 1 S. Little, S. Ward Sur. 194, 13⅜-in. csg. 179 ft.; drlg. 8,215 ft.

Fred W. Shield's No. 1 J. O. Moore, De Lores I.&A. Sur., Sec. 143. R.U.

Southern Minerals Corp.'s No. 1 Community. Paso Ancho de Abajo gr. T.D. 6,578 ft.; 7-in. csg. on bttm.; perf. csg. 6,390-98 ft.; flwg. est. 100 B.P.D.; 9/64-in. ck.

Texas Conservative Oil Co.'s No. 1 Isensee, Gregorio Farias Sur. Cg. sh. 5,250 ft.

San Patricio County

W. S. Boyle and R. Wimberly's No. 1 R. L. Hodges. Drlg. sh. 3,760 ft.

Starr County

A. L. Bone et al's No. 3 Garcia, Juan Salinas Porc. 71. T.D. 409 ft.; abd.

Sun Oil Co.'s No. 1 Claude King, C.C.S D.&R.G.N.G.R.R. Sur. 511. S.D. 4,555 ft.

Victoria County

Coastal Drlg. Co.'s No. 1 Goldman, V. Garcia Lge. R.U.

Colten & Colten's No. 1 Terrell, J. B. Sideck Sur. T.D. 5,285 ft.; 7-in. csg. 5,284 ft.; T.D. 5,609 ft.

Humble O. & R. Co.'s No. 1 E. N. Nave, M. J. Treaviesa gr. Drlg. sh. 1,732 ft.

Pacific Irwin O. & G. Co.'s No. 1-B Keeran, M. de Leon Sur. Drlg. sh. 5,540 ft.

S. W. Richardson's No. 1 Keeran, M. de Leon Sur. Drlg. sh. 7,739 ft.

Texas Gulf Prod. Co.'s No. 1 Wiseheart, F. Perez Sur. 10¾-in. csg. 1,023 ft.; T.D. 6,506 ft.; 5½-in. csg. 5,240 ft.; tstg.

Webb County

H. E. Hall's No. 1 Slator, Mission Oil Co., J. V. Borrego gr. 7-in. csg. 1,456 ft.; S.D. 1,470 ft.

Locke Purnell's No. 3 Kirkpatrick, C.C. S.D.&R.G.N.G. Sur. 27. Loc.

Fred Schwab's No. 1 W. C. Billings, Tom Dillars Sur. 42. Loc. abd.

Tide Water Asso. Oil Co.'s No. 8 Bruni, M. Arispe gr.; (deep test, Bruni field). Drlg. sh. 3,669 ft.

Williamson County

Jas. Criswell's No. 1 R. Z. Baker, Theophilis W. Metcalf Sur. S.D. 500 ft.; abd.

C. C. Lanier's No. 1 Guental, Harry Cooke Sur. Drlg. 2,445 ft.

Wm. C. McGlothlin's No. 1 Swenson, Wm. Byerly Sur. 24. T.D. 2,310 ft.; abd.

Wilson County

W. D. Moore et al's No. 1 Lorenz, Morris May Sur. S.D. 75 ft.

Walter Nelson's No. 1 Geo. W. Platner, T.E.L. Parrott Sur. 160. Drk.

Zapata County

Hawkeye Pet. Co.'s No. 1 Uribe, J. V. Borrego Sur. T.D. 3,212 ft.; S.D.

Zavala County

H. F. Wilcox O. & G. Co.'s No. 6 Gilliam, Pedro Mesa Sur. 12. T.D. 3,922 ft.; recmtg. csg.

H. F. Wilcox O. & G. Co.'s No. 1 Voigt, Jas. Crabtree Sur. 30. T.D. 4,198 ft.; prep. to abd.

H. F. Wilcox O. & G. Co.'s No. 1 Webb & Brown, J. M. Polk Sur. Drlg. sh 70 ft. No report.

WEST TEXAS WILDCATS

Andrews County

Atlantic Refg. Co.'s No. 1-2 University, Sec. 2, Blk. 11, Univ. Lds. Sur. W.O.C.; csg. 4,192 ft.; T.D. 4,210 ft.

Atlantic Refg. Co.'s No. 1-23 University, Sec. 23, Blk. 11, Univ. Lds. Sur. Drlg. 3,790 ft.

Helmerich & Payne, Inc.'s No. 1 University, Sec. 11, Blk. 11, University Sur.; 5,500-ft. test. Flwg. 10 B.O.P.H.; T.D. 4,475 ft.; has been acd. with 14,000 gal. and shot with 500 qt.

Brewster County

J. W. Quinn,, Tr.'s No. 1 S. L. Strumburg, NW cor. SE Sec. 70, Blk. G, M.K. &T.E. Sur., 2,500-ft. test. Drlg. 480 ft.

Cochran County

Texas Co.'s No. 1-F Mallett Land & Cattle Co., SW cor. Labor 25, Lge. 51, Scurry C.S.L. Sur. Drlg. 4,970 ft.

Concho County

Floyd Dodson's No. 1 Wilson, Thomas Green Sur. 1; 3,500-ft. test. Tstg. wtr. shutoff 3,462 ft.; prep. D.D.

Crane County

Gulf Oil Corp.'s No. 5 M. B. McKnight, Sec. 1, Blk. 21-B, P.S.L. Sur. Drlg. 6,705 ft.

Gulf Oil Corp.'s No. 1-F University, SE SE Sec. 22, Blk. 31, Univ. Sur. Drlg. 1,400 ft.

Gulf Oil Corp.'s No. 12 Waddell, Sec. 30, Blk. 26-B, P.S.L. Sur. 12-in. 532 ft.; S.O. 3,215-20 ft.; S.S.G. 3,635 ft.; 8-in. csg. cmtd. 3,713 ft.; S.O. wtr. 3,763 ft.; tstg. 3,780 ft., mostly wtr.; drlg. 4,350 ft.

Gulf Oil Corp.'s No. 31 Waddell, Sec. 5 Blk. 24-B, P.S.L. Sur. T.D. 4,047 ft., wtr.; P.B. to 3,400 ft.; to test.

Crockett County

Gregory & McCandless' No. 1 Shannon estate, 1,787 ft. from S and 3,107 ft. from E lines of Lge. 3, Archer C.S.L. Sur. Drlg. 300 ft.

Moore Explsn. Co.'s No. 1 A. C. Hoover, Sec. 16, Blk. 1, G.C.&S.F. Sur. W.O.C. 2,100 ft.; S.S.O. 1,920-2,100 ft.; swbg. est. 3 B.O.P.D. at 2,149 ft.; T.D.

Dawson County

Ray Albaugh's No. 2 Robinson, NW NW Sec. 54, Blk. M, E.L.R.R. Sur. Drlg. 5,163 ft. with 4,000 ft. sulf. wtr. in hole.

Gaines County

Richmond Drlg. Co. et al's No. 1 G. R. Brumley, NE NE Sec. 17, Blk. 12-A, P.S.L. Sur. T.D. 4,664 ft.; S.S.O.; prep. cmt. csg. 4,360 ft.

Howard County

C. T. McLaughlin's No. 1 Pete Johnson, NE NE Sec. 34, Blk. 32, Twp. 1n, T. &P. Sur. Drlg. 1,950 ft.; prep. set pipe at 2,000 ft.

M. L. Richards' No. 1 Thelma J. Cole, SE NW Sec. 12, Blk. 26, H.&T.C. Sur. 3,500-ft. test. Drlg. 810 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co.'s No. 1 Briggs, Sec. 24, Blk. 73, Twp. 7, T.& P. Sur. T.D. 6,175 ft.; 5½-in. csg. set at 6,150 ft.

Mitchell County

B.R.S. Oil Co.'s No. 1 M. A. Berry, 407 ft. from S and E lines of Sec. 83, Blk. 97, H.&T.C. Sur. C.O. after shot 1,739-93 ft.; 400 ft. O.I.H.

Ewing & Hanes' No. 1 G. I. Grable, Sec. 195, Blk. 3, H.&G.N. Sur.; 1,900-ft. test. S.S.O. 1,620-40 ft.; S.D.O.

N. V. Hilburn's No. 1 E. T. Strain, Sec. 82, Blk. 97, H.&T.C. Sur. S.D.O. 1,790 ft.; drld. sat. 1,706-32 ft. and 1,786-89 ft.; est. 4 B.O.P.D. naturally; shot 300 qt. 1,700-1,800 ft.; tstg.; 150 ft. O.I.H.

Pecos County

R. G. Pattillo's No. 1 P. E. O'Neal, SW SW Sec. 74, Blk. 10, H.&G.N. Sur., 5,000-ft. test. S.D.O. 260 ft. (cor.).

Plymouth Oil Co.'s No. 1 Richard Levy, SW cor. Sec. 104, Blk. 8, H.&G.N. Sur. Drlg. 4,255 ft.

H. H. Sides' No. 1 Blackstone-Slaughter, Sec. 20, Blk. 129, T.&St.L. Sur., 1,050 ft. W. 250 ft. S lines of section. Drlg. 1,100 ft. (last report).

Reagan County

R. E. Ringo's No. 1 fee, 1,320 ft. from N and W lines of Sec. 22, Blk. K, 3,500-ft. test. M.I.M.

Reeves County

Roy Johnson's No. 1 H. L. Perkins. Drlg. 880 ft.

Scurry County

Coffield & Guthrie, Inc.'s No. 1 J. W. Moar, Sec. 334, Blk. 97, H.&G.N. Sur., NW Sec. 4,500-ft. test. Drlg. 3,985 ft.

Ordovician Oil Co.'s No. 1 O. L. Burney, NW NW Sec. 146, Blk. 97, H.&T.C. Sur. Flwd. 145 B.O. in 6 hrs.; T.D. 2,461 ft.

Stonewall County

Shell Oil Co., Inc.'s No. 1 J. D. Patterson, SW NW Sec. 393, Blk. D, H.& T.C. Sur. Ordovician test. M.I.M.

Shell Oil Co., Inc.'s No. 1 Smith, Sec 143, Blk. 1, H.&T.C. Sur. Top Mississippian at 6,007 ft., top saturation at 6,015 ft. and drilled to T.D. 6,028 ft. in saturation; flwd. 280 bbl. oil in 24 hrs.; drlg. 6,085 ft.; at 6,050 ft. well flowed 68 B.O.P.D.

Upton County

B. C. & D. Dev. Co.'s No. 1 Richard Owens, NE NW Sec. 91, Blk. Y, G.C. &S.F. Sur. Drlg. 725 ft.

Ward County

Atlantic Ref. Co.'s No. 1 Wickett-University, Sec. 12, Blk. 16, University Lds. Sur., 1,980 ft. N and E lines of section. Prep. D.D. 2,733 ft.; S.S.O. 2,570-2,677 ft.; est. 380,000 cu. ft. gas; flwd. 30 to 40 bbl. oil hourly 2,892 to 2,907 ft.; flwd. 445 B.O. and 1,487 B.W. in 24 hrs.; made 458 bbl. oil and 357 bbl. water in 24 hrs.; P.B. to 2,912 ft. to shut off wtr.; last flow 480 bbl. fluid, 52 bbl. were oil; tstg. for completion.

Gulf Oil Corp.'s No. 5 Wristen, Sec. 13, Blk. 5, H.&T.C. Sur.; scheduled Ordovician test. Rmg. to T.D. 7,986 ft.

Kenneth Slack's No. 1 Bird Hayes, Sec. 148, Blk. 34, H.&T.C. Sur. T. Delaware 5,003 ft.; S.D. 5,010 ft.; T. Dela. sd. and hit est. 15,000,000 cu. ft. gas at 5,050 ft. and gas ignited; making 10,000,000 cu. ft. gas daily; made 1 bbl. oil hourly on test; later made est. 2 bbl. hourly; 5,063-88 ft. T.D.; S.I. 5,088 ft.; made 2 bbl. oil per hr. through separator with 12,000,000 cu. ft. gas; tstg.

Winkler County

Gulf Oil Corp.'s No. 136 O'Brien, SE SW Sec. 11, Blk. F, G.M.M.B.&A. Sur. Drlg. 2,850 ft.

Yoakum County

Amerada Pet. Corp.'s No. 1 A. M. Brownfield, NE SW Sec. 620, Blk. D, Gibson Sur. 5,500-ft. test. Drlg. 4,175 ft.

E. C. TEXAS WILDCATS

Henderson County

Manning & Pickens' No. 1 T. H. Bell, D. Muckleroy Sur., 6 mi. SW of Mabank. W.O.C.; 10-in. at 3,195 ft.

Kaufman County

Bateman & DeArman's No. 1 General American Life Ins. Co., J. Baker Sur., 6 mi. W of Mabank. W.O.C. 101 ft.

W. H. McGee's No. 1 Rutland Savings Bnk., John Baker Sur., 2¼ mi. NE of Tulosa. S.D. 3,115 ft.; wtr. broke in around csg.

Red River County

Joe White's No. 1 Kurth Lbr. Co., E. Smith Sur., near Allen Mill. R.U.R.

Rusk County

J. S. Harrold's No. 1 M. J. Armstrong, M. D. Carmel Sur., 3 mi. SE Henderson. Drk. and M.I.M.

Upshur County

H. C. McGahey's No. 1 Ludie Turner, SE cor. 200-ac. tr. in A. Butler Sur. Spd. and S.D.

EAST TEXAS

(Border Counties)

Bowie County

W. E. Neill's No. 1 L. Fort, 600 ft. NL, 150 ft. EL, 103-ac. tr., L. Peters Sur. S.D. 2,050 ft.

W. E. Neill's No. 1 Lewis Fort, 600 ft. N and E lines of 103-ac, tr., L. Peters Sur. S.D.O. 2,050 ft.

Shell Oil Co., Inc.'s No. 1 W. D. Wall, 467 ft. EL, 871 ft. SL, S extn., 2,154-ac. tr. John Downey Sur. Set 9⅝-in. csg., 1,006 ft.; W.O.C.; T.D. 1,015 ft.

Shell Oil Co., Inc.'s No. 1 W. D. Hall, 6,900 ft. EL and 4,000 ft. SL of J. Downey Sur.; 6,000-ft. test. Drlg. 1,700 ft.

Harrison County

Ark. La. Gas Co.'s No. 1-C Abney, Jas. Shandoin Sur. Drlg. sh.&L. 4,243 ft.

Marion County—Other

L. E. Baker & Bryan's No. 1 A. L. Hartzo, 1,460 ft. N, 315 ft. W, SE cor. G. Coor Sur. Fsg. 2,319 ft.

J. D. Baker's No. 2 Decker, 500 ft. S. 300 ft. W, NE cor. J. G. Reeves Sur. Drlg. sh. 860 ft.

John Coats' No. 5 Ida Burr, 1,600 ft. due S No. 2, J. G. Reeves Sur. R.U.

Jules Constantine's No. 1 S. Hart, 435 ft. N, 330 ft. E. SW cor. 25-ac. tr., G. Coore Sur. Tstg. 2,310 ft.

T. B. Donnell's No. 1 E. W. Easterling, 330 ft. S, 1,200 ft. W. NE cor. 200-ac tr., M. G. Nall Sur. T.D. 2,341 ft.; set 5⅛-in. csg. 2,234 ft.; pmpg. S.W. 2,341 ft.; W.O.

M. D. Fitzwater's No. 1 C. Moseley, 3,800 ft. SL, 3,700 ft. WL, Wm. H. Burton Sur. 8-in. csg. 2,244 ft.; T.D. 2,316 ft.; blg. est. 10 B.P.D.

Henry & Parson's No. 1 W. C. Ralph, Eli Usury Sur., 3 mi. N of Jefferson. Set 9⅝-in. csg. 1,012 ft.; T.D. 1,865 ft.; W.O.C.

R. B. Hollandsworth's No. 1 J. D. Hartzo, 2,820 ft. N, 2,050 ft. W, SE cor. D. Hartzo Sur. 189. Drlg. 2,240 ft.

J. M. Horne's No. 1 W. F. Singleton, 1,331 ft. EL, 50 ft. NL, J. O. Jackson Sur. Set 5½-in. csg. 2,267 ft.; tstg. 2,512 ft.

H. T. Manning's No. 1 T. O. Livingston, G. Coore Sur. Drlg. chalk 1,740 ft.

J. D. Reynolds' No. 6-B Terry est., 175 ft. NL L. Whatley tr., 1,000 ft. EL W. Coore Sur. R.U.

Roosth & Genecov's No. 1 T. O. Livingston, 300 ft. SW cor. 8-ac. tr., G. Coore Sur. Set. 5½-in. csg. 2,281 ft.; T.D. 2,424 ft.; tstd. dry.; W.O.

Sanders & Wycliffe's No. 1 Sid Hart, 960 ft. N, 60 ft. E, SW cor. G. Coore Sur. Set 5½-in. csg. 2,300 ft.; W.O.C. 2,305 ft.

Texas Canadian Oil Co.'s No. 1 B. Mackey, 282 ft. NL, 218 ft. WL, 35-ac. tr., Lewis Needham Sur. Drlg. 2,147 ft.

Sabine County

Sterm & Womack's No. 1 I. K. Kieth Southwestern Lands, 400 ft. SL, 500 ft. EL, 53-ac. tr., L. Grace Sur. Drlg. sh. 1,320 ft.

Shelby County

Earl McDaniels et al's No. 1 J. S. Swann, 470 ft. EL, 1,400 ft. SL, 100-ac. tr., Ann Gray Sur. Cd. 2,665-76 ft.; rec. 11 ft. hd. dense L., stain oil.; S.D. 3,605 ft.; sh.&L.

P. & B. Oil Co.'s No. 2 W. C. Windham, A. K. English Sur. Set 10-in. csg. 170 ft.; T.D. 5,335½ ft.; tstg.

W. C. Parker's No. 1 F. G. Willey, 480 varas NL, 240 varas EL, 94-ac. tr., A. K. English Sur. Set 5½-in. csg. 3,330 ft.; cg. sh. 3,380 ft.

Superior Oil Co. of Tulsa's No. 2 Pickering Lbr. Co., 1,020 ft. N, 467 ft. E, SW cor. W. J. Crane Sur., in B. H. Simpson Sur. Drlg. 1,997 ft.

Superior Oil Co. of Tulsa's No. 3 Pickering Lbr. Co., 1,620 ft. SE, 660 ft. due W, easterly NE cor. Thos Haley Sur. Loc.

WEST CENTRAL TEXAS DISTRICT

Brown County

H. T. B. Prod. Co.'s No. 1 C. R. Smith, NW NW S½ Sec. 31, H. P. Brewster Sur. 290; 1,300-ft. test. S.D.R. 405 ft.

A. M. Stalcup's No. 1 J. C. Morris, 900 ft. S, 700 ft. E lines of Morris tr. in John Goodwin and W. B. Hester Surveys. S.D. csg. 972 ft.

Callahan County

N. D. Gallagher's No. 1 E. Grisson, SE pt. Sec. 2, Blk. 8, S.P. Sur. Drlg. 1,040 ft.

C. D. Hagerty's No. 1 T. Windham, NW SE Sec. 154, Blk. 3, G.H.&A. Sur.; 1,000-ft. test. Drlg. 300 ft.

H. W. Lee's No. 1 Mrs. Murray Harris, SW cor. NW SW Sec. 99, B.B.B.&C. Sur.; 1,350-ft. test. Drlg. 1,000 ft. last report.

J. L. Reeves' No. 1 N. A. Estes, SW¼ Sec. 4, Blk. 8, S.P. Sur., 2½ mi. S of Bowles pool. M.I.M.

W. H. Street's No. 1 Hill, 1,707 ft. from S and 1,368 ft. from E lines of John Gillespie Sur. 340, 1,275-ft. test. Loc.

Coleman County

Anzac Oil Corp.'s No. 1 McCord, 2,200 ft. E, 2,196 ft. S of B.B.B.&C. Sur. S.D.O. 2,069 ft.

Lone Star Gas Co.'s No. 1 Irene Wells, 606 ft. from N and 770 ft. from W lines of Subd. 2, M. A. Fisk Sur. 630, 2,400-ft. test. Loc.

McKissick's No. 1 Morris, 330 ft. N, 1,582 ft. W lines, Blk. 2, G.H.&H. Sur. Prep. test; Gardner sd. topped at 3,530 ft. with sat; flwg. est. 5,000,000 cu. ft. gas and 20 B.O.P.D.; S.D. 3,566 ft.; may C.O. and D.D.

J. C. Ort's No. 1 Emet Walker, SE cor. Hicks Sur. W.O.C. 700 ft.

Coryell County

Kistler O. & G. Co.'s No. 1 Barnes, 300 ft. SE line, 3,700 ft. NE line of H. Farley Sur., 3 mi. NE of Gatesville; 2,500-ft. test, S.D.O. 830 ft.

Eastland County

Dobbs Oil Corp.'s No. 1 Mrs. R. L. Poe, 1,320 ft. from S and E lines, of SE¼ Sec. 37, Blk. 3, H.&T.C. Sur. S.D.R. 925 ft.

Dobbs Oil Corp.'s No. 1 Thomasson, S. H. Key Sur., 330 ft. from N, 846 ft. from E line of 80-ac. tr. T. Caddo 2,560 ft.; S.S.O.&G. 2,570 ft.; set 7-in. 2,570 ft.; comp. 243 B.P.D.

Jones & Stasney and Groover & Rose's No. 1 McElreath, C SW Sec. 104, Blk. 3, H.&T.C. Sur.; 3,500-ft. test. Drlg. 1,440 ft.

Steele & Black's No. 1 B. B. Poe, 180 ft. N and E lines, SE¼ Sec. 6, Blk. 3, H.&T.C. Sur.; 900-ft. test. Rng. csg. 847 ft.

Erath County

Dillingham's No. 1 Morning. S.S.G. 3,650 ft.; S.D.O. 3,691 ft.

E. H. Young's No. 1 J. B. Mills, J. Harry Sur., 5 mi. NW of Dublin; 3,500-ft test. Mach. on loc.

Hamilton County

A. J. Caldwell's No. 1 W. W. Jones, 1,003 ft. from NE, 150 ft. from SE lines of W. H. Crowder Sur. Drlg. 2,850 ft.

Gunther & Smith's No. 1 C. Thompson, 467 ft. SE, 4,533 ft. SW lines, Rhody Kennedy Sur.; 4,500-ft. test. Spd. and S.D.

Hensley & Watson's No. 1 M. Manning, 467 ft. W, 2,500 ft. S lines of Agaop Gathan Sur.; 4,500-ft. test. R.U.R.

Wallace & Wallace's No. 2 C. E. Lund, C S½ E 20 ac., N½ SW¼, R. J. Bailey Sur. 51. Csg. 300 ft.; S.D. csg. 3,285 ft.; T. Marble Falls 3,245 ft.; drlg. 3,528 ft.

B. Waters' No. 1 A. Oates, 3,350 ft. SE, 8,450 ft. NE lines of F. Hughes Sur.; 4,000-ft. test. May change operator.

Jones County

Geo. Callihan's No. 1 J. J. Steele, NE cor. SE Sec. 11, Blk. 15, T.&P. Sur. Drlg. 1,940 ft.

J. C. Hunter's No. 1 J. Sayles, SE N½ Subd. 8, R. Smith Sur. 192, just NE of Hawley; 3,300-ft. test. Drld. sat. 2,334-45 ft.; tstg. aft. 1,000 gal. acid.

Merry Bros. & Perini's No. 1 C. S. Walker, SE cor. Walker tr., G. Martinez Sur. 137. Drlg. 1,230 ft.

J. D. Sandefer, Jr.'s No. 1 Hudspeth, 160-ac. tr. in Subd. 22, Edw. Miles Sur. 219. Drlg. 2,325 ft.

Parker County

Brown & Gardner Bros.' No. 1 Gilbert T.&P. Sur., Abst. 1958, Tstg. gas; C.O. 100 ft. off bttm.; csg. set 3,905 ft.; S.I. 4,327 ft.; est. 500,000 ft. gas and spray oil; tstg.; S.D.O.

C. F. Carter's No. 1 E. F. Yeager, 1,000 ft. from N, 300 ft. from E lines of C. H. Atkinson Sur.; 1,000-ft. test. S.D.O. 268 ft.; H.F.W.; drlg. 600 ft.

W. M. Holland and C. Leidecker's No. 1 G. W. Keeling, F. Lidely Sur., Abst. 829, 1½ mi. W of Springtown; 3,500-ft. test. S.D.R. 1,635 ft. last report.

C. Leidecker and Wm. Holland's No. 1 J. A. Boyd, NE NE of S 100 ac. of A. J. Edwards Sur.; 4,500-ft. test. Drlg. 1,850 ft.

Stephens County

Carey's No. 1 Crudington, SE cor. T.E. &L. Sur. 1268, 5½ mi. S of Stribling field. W.O.C. at 3,361 ft.; S.O. from 3,-362-64 ft.; acd. with 2,000 gal. 3,362-71 ft.; S.D.O. 3,720 ft.

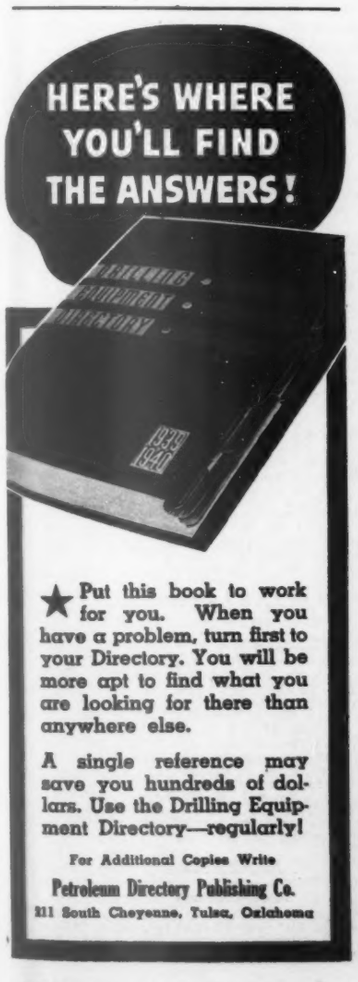
Dean L. Matteson's No. 1 J. R. Craighead, 933 ft. from S and 467 ft. from W lines. of Sec. 1,517, T.E.&L. Sur. Loc.

Panhandle Ref. Co.'s No. 1 Frank Magers, SE Sec. 1, Blk. 3, S.P. Sur., 1¾ mi. N of Fagg area. Prep. abd. 4,037 ft.

J. R. Tolbert's No. 1 W. L. Martin, NW cor. NE¼ Blk. 1335, T.E.&L. Sur., 1½ mi. SW of Fagg area. Drlg. 3,500 ft.

Taylor County

Yehudi Oil Co.'s No. 1 J. Bettes, R. Ortiz Sur. 19; 2,500-ft. test. U.R. 2,460 ft.



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NORTH TEXAS WILDCATS

Archer County

L. T. Burns' No. 1 Mrs. J. Turberville, NW cor. Blk. 154, Robt. Carson Sur., Abst. 80; (Caddo lime test). R.U.R.

Baylor County

R. T. Myers' No. 1 W. H. Portwood, Sec. 19, H.&T.C. Sur., Blk. 45. Drlg. 510 ft.

Rogers' No. 1 Howe, J. Howe Sur., Abst. 572. Drlg. 820 ft.

Clay County

Deep Rock Oil Co.'s No. 1 S. Dycus, Sec. 2602, T.E.&L. Sur.; 3,600-ft. test. Drlg. 3,144 ft.

J. E. Farrell's No. 1 C. R. Malone, Sec. 12, T.&N.O. Sur., Abst. 828. Drlg. 5,695 ft.

Franklin Pet. Corp.'s No. 1 E. B. Staggs, Blk. 55, Archer C.S.L. Sur. Drlg. 5,163 ft.

E. C. Norwood's No. 1 K. N. Hapgood, Sec. 61, M.C.S.L. Sur.; 6,000-ft. test. Drlg. 5,275 ft.

Cooke County

Tolbert & Rutledge's No. 1 H. W. Stark, 330 ft. from W and 466 ft. from S lines of SE¼ of D. C. Hudson Sur. Loc.

Youngblood & Foree's No. 1 Ida Wynne, Sec. 2, T.&N.O. Sur., Abst. 795.; O.W. D.D. below 6,070 ft.

Cottle County

J. E. Burns et al's No. 1 J. E. Moss, Sec. 5, Blk. L, A. Forsythe Sur. Jnkd. 225 ft.; skd. 20 ft. S; S.D. 1,823 ft.

Denton County

Seitz, Comegy & Seitz' No. 1 F. Freeman, M.E.P.&P. Sur., Abst. 1470. Drlg. 4,565 ft.

Shooks & Finnell's No. 1 Sanders, Noling Sur. 5-⅞-in. 1,995 ft.; drlg. plug; sat. L 2,013-45 ft.; acd. 1,000 gal.; shot 50 qt.; no results; S.D.O.

Trentman Oil Co.'s No. 1 A. Madwell, J. Withers Sur., Abst. 1343; 4,000-ft. test. Loc.

Hardeman County

Norris & Gilbert's No. 1 Robert Weekley, SW SE Sec. 87, Blk. 16, H.&T.C. Sur. S.D.R. 3,275 ft.; rebidg. drk.

Jack County

R. A. Conkling's No. 1 M. Hoofle, A. James Sur., Abst. 318, 3 mi. S Antelope; 3,500-ft. test. Drlg. 100 ft.

Noah Daves' No. 1 K. D. Baker, Sec. 2709, T.E.&L. Sur. Fsg. 3,166 ft.

Harper Pet. Co.'s No. 1 F. V. Vanhooser, J. F. Lewis Sur. Loc.

Harper Pet. Co.'s No. 1 J. W. Kinder, SW¼ Sec. 2667, T.E.&L. Sur., Abst. 762. T.D. 2,160 ft.; S.D.

Montague County

Continental Oil Co.'s No. 1 Drummond, SE cor. Sec. 8, Limestone C.S.L. Sur., 1 mi. NE of Stoneburg. Loc.

W. H. Gant and Continental's No. 1 J. L. Brown, Sec. 58, E.T.R.R. Sur. Tstg.

Walter Gant's No. 1 Will Laird, R. T. Millard Sur., Abst. 470, 7 mi. W of Sunset. Drlg. 3,472 ft.

Harvey Drlg. Co. et al's No. 1 D. A. Threadgill, Sec. 10, Jack Co. Sch. Ld. Sur. A-390; 6,000-ft. test. Drlg. 6,245 ft.

Hults & Owens' No. 1 Tucker, NW cor. Sec. 2836, T.E.&L. Sur. Loc.

Tom F. Hunter's No. 1 Fatheree, E½ S. L. Gilliland Sur., 3 mi. S of Illinois Bend in north pt. of county. Loc.

W. H. Peckham's No. 1 Dr. Lawson, N. Kimbro Sur., Abst. 405. Drlg. 3,120 ft.

Sinclair Prairie's No. 1 T. H. Mlam, Lot 54, A. Beason A-20 Sur.; 6,000 ft. test. Tstg. S.S.O. 5,666-77 ft.; 6⅝-in. at 5,-683 ft.; perf. csg. 5,620-28 ft.; swbd. 1 B.O.; drlg. 5,707 ft.

Sinclair Prairie Oil Co.'s No. 1 G. Whaley, SW cor. of N½ of T. R. Jackson Sur., Abst. 394; 6,000-ft. test. Drlg. plug on 6⅝-in. csg. at 5,120 ft.

Tarrant County

W. L. Cox's No. 1 N. H. Poole, 160 ft. from S and W lines of J. McDonald Sur. Loc.

Throckmorton County

Normandie Oil Corp.'s No. 1 Travis, Sec. 37, Travis Co. Sch. Ld. Fishing 5,127 ft.

Wichita County

Consolidated Oil Co.'s No. 1 E. M. Barnes K, Sec. 11, Blk. 7, H.&T.C. Sur. 6⅝-in. csg. at 4,336 ft.; saturation from 4,336-70 ft.; D.D. to 4,395 ft.; shot with 200 qt., 4,350-95 ft.; drlg. 4,406 ft.

Wilbarger County

Amerada Pet. Corp.'s No. 1 B. Goodpasture, Sec. 35, H.&T.C. Sur., Blk. 15. 8,000-ft. test. Sat. lime 4,407-20 ft.; 600 ft. oil and 150 ft. mud on 60-min. D.S.T.; set csg. 6,306 ft.; drld. plug and swbd. 15 B.O.P.H.; drlg. 6,359 ft.

O. M. Stidham & Son's No. 1 C. D. Watts, Sec. 64, H.&T.C. Sur., Blk. 15.; 6,000 ft. test. Drlg. 3,105 ft.

Young County

Commodore Oil Co.'s No. 1 Clinton Realty Co., Sec. 2,384 ft. T.E.&L. Sur. Drlg. 2,870 ft.

H. W. Dyer's No. 1 M. G. Cheney, M. L. Terry Sur., Abst. 1261. S.D. 2,130 ft.; repra.

K. R. March's No. 1 Ed Burton, NE cor. Blk. 99, J. A. True Sur., Abst. 1640, 4 mi. SE Graham; 4,250-ft. test. 4,500 gal. acid 3,952-4,014 ft.; 1,800 ft. O.I.H.; testing.

A. T. Strong's No. 1 Craig heirs, N. Lynch Sur. Drlg. 3,650 ft.

TEXAS PANHANDLE

Childress County

Texas Co.'s No. 1 P. B. Smith, NW NW Sec. 97, Blk. 9, H.&G.N. Sur., 7,500-ft. contract. Had salt water and air blow-out at 500 ft.; well under control and prep. D.D.

Cottle County

Burns et al's No. 1 Moss, Sec. 5, Forsythe Sur. S.D.O. 1,960 ft.

Dickens County

Bond Jones' No. 1 Foard, I.&G.N. Sur. S.D.O. 4,400 ft.

Hall County

Humble Oil & Ref. Co.'s No. 1 A. D. Weaver, SW NW Sec. 51, Blk. 1, S.P. Sur.; 7,500-ft. test. S.D.O. 2,300 ft.

Hutchinson County

Jake Phillips' No. 1 McCloy, Sec. 101, Blk. 5-T, T.&N.O. Sur. Hole filled 2,000 ft. with oil; tstg.

Ochiltree County

James R. Macon et al's No. 1 W. R. Norris, SW SE Sec. 212, Blk. 43, H.&T.C. Sur. T.D. 6,274 ft.; test sec. at 5,000 ft.; est. 6,000,000 cu. ft. gas on D.S.T.; tstg.; bailing 6,274 ft.; csg. cmt. at 5,000 ft.; R.U. control head for testing at est. 6,000,000 cu. ft. gas; plug drilled; tstd. wtr.; S.D. 5,021 ft.

Potter County

Canadian River Gas Co.'s No. 1 City of Amarillo, in city limits just north of city. Prep. cmt. to 3,825 ft. and shoot with 140 qt. from 3,784-97 ft.

Sherman County

I.T.I.O. Co.'s No. 1 S. C. Bryant, C NW¼ Sec. 369, Blk. T-1, T.&N.O. Sur. Perf. csg. from 3,975-88 ft.; shot with 60 qt.; C.O. after acid.; no results.

Swisher County

Krupp-Flaherty's No. 1 Kleen, Sec. 120, Blk. 10-M, B.S.&M. Sur. S.D.O. 800 ft.

WEST TEXAS COMPLETIONS

Hockley County: Slaughter field, Awoeb Oil Co.'s No. 5 Davis, 4,904-5,018 ft., 1,192 bbl. Rowan Drilling Co.'s No. 1 Mallett, 4,988-5,026 ft., 460 bbl. Stanolind Oil & Gas Co.'s No. 7-A Slaughter, 4,935-5,025 ft., 810 bbl.

Scurry County: Sharon field, Helmerich & Payne, Inc.'s No. 6 W. Martin, 2,260-2,485 ft., 98 bbl. F. W. Merrick's No. 1 West Texas National Bank, 2,155-2,437 ft., 156 bbl.

Pecos County: Lehn field, Keeney's No. 4 Masterson-Lehn, 1,680-1,758 ft., 84 bbl. Tobarg field, Rife's No. 13 Tippett, 467-81 ft., 26 bbl. Ohio Oil Co.'s No. G-1-13 Yates, dry and abandoned at 544 ft. Taylor-Link field, Eastham's No. 3-B University, 1,595-1,628 ft., 227 bbl.

Ward County: North Ward field, Richardson's No. 3-B University, 2,515-2,735 ft., 400 bbl. Estes field, Gulf Oil Corp.'s No. 134 Estes, 2,480-2,680 ft., 994 bbl. Pecos Valley field, Garrett's No. 1 Bennett, dry and abandoned at 1,400 ft. Reese & Pittman's No. 1 Texas Cotton, 1,872-1,951 ft., 66 bbl. (old well drilled deeper). Reese & Pittman's No. 2 Texas Cotton, 1,875-1,975 ft., 15 bbl. Edwards' No. 4 Reynolds, 1,840-80 ft., 581 bbl.

Winkler County: Kermit field, Bates & Reading's No. 1 McCabe, 2,825-3,020 ft., 313 bbl.

Yoakum County: Wasson field, Humble Oil & Refining Co.'s No. 6 Bennett, 5,050-5,235 ft., 708 bbl.

Crane County: Sand Hills field, Humble Oil & Refining Co.'s No. 38 Tubb, 4,270-4,401 ft., 1,283 bbl.

Crockett County: Wildcat, Moore Exploration Co.'s No. 1 Noelke, 2,160-2,371 ft., 130 bbl.

Ector County: North Cowden field, Stanolind Oil & Gas Co.'s No. 2-8 Midland Farms, 4,350-4,607 ft., 1,603 bbl. Goldsmith field, Phillips-Pure's No. 91 Cowden, 4,103-58 ft., 2,957 bbl. Gulf Oil Corp.'s No. 291 Goldsmith, 4,155-4,245 ft., 1,634 bbl. Johnson field, Ohio Oil Co.'s No. 1 Johnson, 4,030-4,157 ft., 394 bbl. Sunray Oil Co.'s No. 1-G Johnson, 4,085-4,285 ft., 372 bbl. Sunray Oil Co.'s No. 4-D Johnson, 4,060-4,150 ft., 474 bbl. Foster field, Lee Drilling Co.'s No. 1f Johnson, 4,170-4,298 ft., 465 bbl. Humble Oil & Refining Co.'s No. 1-B Henderson, 3,958-4,190 ft., 1,035 bbl. Atlantic Refining Co.'s No. 12 Henderson, 4,066-4,250 ft., 623 bbl. Stanolind Oil & Gas Co.'s No. 49-A Cowden, 3,935-4,105 ft., 794 bbl. Jordan field, Gulf Oil Corp.'s No. 2 State N, 3,545-75 ft., 7,732 bbl.

Gaines County: Wasson field, Continental Oil Co.'s No. 3-A-50 L. Wasson, 4,930-5,040 ft., 1,347 bbl. Seminole field, Osage Drilling Co.'s No. 1-B Tippett, 5,145-5,322 ft., 469 bbl.

Atlantic Refining Co.'s No. 7-B T. S. Riley, 5,032-5,262 ft., 908 bbl. Anderson-Prichard Oil Corp.'s No. 4-759 Gibbson-Willard, 4,925-5,180 ft., 920 bbl. Shell Oil Co., Inc.'s No. 13-A Baumgart, 4,865-5,165 ft., 1,231 bbl. Shell's No. 15-A Baumgart, 4,885-5,195 ft., 1,374 bbl. Shell's No. 16-C Baumgart, 4,870-5,184 ft., 1,595 bbl. Helmerich & Payne, Inc.'s No. 1 Dowell, 4,960-5,035 ft., 434 bbl. (old well drilled deeper). Honolulu Oil Corp.'s No. 5-890 Hovencamp, 4,925-5,100 ft., 1,852 bbl. Phillips Petroleum Co.'s No. 3 Dowden, 4,960-5,072 ft., 619 bbl.

CRUDE-OIL PRICES IN REPRESENTATIVE FIELDS

Complete crude-price schedules are now being published in the first issue of each month. The last complete schedule was published in the June 6 issue. All changes in crude-oil-price schedules will be published completely in the first issues following the announcement of the changes. Following are representative crude-price schedules in barrels (42 gal.):

East Texas	$1.10
Conroe	1.27
Tepetate, Louisiana	1.08
Smackover, Arkansas, heavy	.73
Illinois basin	1.05
Pecos County, Texas	.78
Lance Creek, Wyoming	.77
Bradford, Pennsylvania	2.25

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

	Signal Hill, California*	Oklahoma, Kansas	Gulf Coast Texas
14-14.9	$.063	....	....
15-15.9	.65	....	....
16-16.9	.65	....	....
17-17.9	.65	....	....
18-18.9	.65	....	....
19-19.9	.69	....	$0.88
20-20.9	.73	$0.70	.88
21-21.9	.78	.72	.90
22-22.9	.82	.74	.92
23-23.9	.86	.76	.94
24-24.9	.90	.78	.96
25-25.9	.95	.80	.98
26-26.9	.99	.82	1.00
27-27.9	1.03	.84	1.02
28-28.9	1.07	.86	1.04
29-29.9	1.10	.88	1.06
30-30.9	1.14	.90	1.08
31-31.9	....	.92	1.10
32-32.9	....	.94	1.12
33-33.9	....	.96	1.14
34-34.9	....	.98	1.16
35-35.9	....	1.00	1.18
36-36.9	....	1.02	1.20
37-37.9	....	1.04	1.22
38-38.9	....	1.06	1.24
39-39.9	....	1.08	1.26
40-40.9	....	1.10	1.28

*Effective February 1, 1940.

Crude-Oil Prices

Pure Oil Co., effective June 25 in the Cumberland field in Marshall County, will pay for royalty oil from its own leases its Oklahoma price for the same grades of oil, less 17 cents per barrel, which represents the cost of shipping by tank car from Aylesworth, Marshall County, to Tribbey, in Pottawatomie County, at which point the oil will enter a pipe line. Recent samples of Cumberland field oil tested 35.9° and 36.1° of gravity, respectively, and if these represent the whole field the royalty-oil price there will be about 83 to 85 cents per barrel.

New Tinsley Oil Horizon Believed in Tuscaloosa

By GEORGE WEBER

JACKSON, Miss., June 24.—A new oil horizon believed to be in the Tuscaloosa formation is showing for possible production in the Tinsley field, Yazoo County. Four more Mississippi wildcats and one Albama wildcat were abandoned.

A new location was staked during the past week, and rig is moving for J. W. Richardson's No. 1 Maggie Berry, C SW NE Section 15-9n-19w, expected to drill to 7,500 ft. Montgomery County seems slated for drilling activity soon, with a Gulf Refining Co. test scheduled by August 25, tentatively staked for Section 23-19n-7e, and the W. O. Allen interests are reported to have made a tentative location in Section 30-17n-7e, on a geophysical prospect. Still another wildcat is planned in the northern part of the county by the J. D. Wilkins interests on a block in Townships 20 and 21n, Ranges 5 and 6e.

Field drilling in the Tinsley field continues slow, due to a limited demand for crude. Production averages 10,000 bbl. daily, moving by tank car to refineries in Baton Rouge and Mobile. A third outlet, which will absorb an estimated 3,500 bbl. daily, will be afforded soon, when the E. C. Johnston refinery, now nearing completion in Vicksburg, is completed.

Of particular interest in Tinsley this week is the discovery of another deeper production formation, indicated by oil shows in Slick-Urschel Oil Co.'s No. 7 Slick, Section 36-11-3, a north-edge test. Operators cored a section at 5,386-5,426 ft., recovering 17 ft. of oil sand, and have run a string of 7-in. casing. The sand is believed to lie in the Tuscaloosa formation, and the oil is reported to be of lighter color than that recovered from Eutaw sands above. Several stray sands are believed producing in Tinsley under Woodruff and Stevens names, but this section seems deeper, and may open further possibilities on the north edge

MISSISSIPPI COMPLETIONS

Wildcat—Holmes County

Exchange Oil Co.'s No. 1 S. D. Gwin, 2,170 ft. north, 1,470 ft. west SE cor. Section 6-16n-1e, dry and abandoned total depth 5,099 ft. A. H. Rowan's No. 1 Eakin, C NW SE Section 20-14n-1e, dry and abandoned, total depth 6,013 ft., Tuscaloosa formation.

Wildcat—Scott County

Exchange Oil Co.'s No. 1 Newell Mineral Lease Co., Inc., 330 ft. NW cor. NE SW Section 30-7n-7e, dry and abandoned, total depth 6,500 ft., Tuscaloosa formation.

Wildcat—Yazoo County

Sells Petroleum Co.'s No. 1 Faulkner, SE NE Section 34-9n-4w, dry and abandoned, total depth, Selma formation, 6,483 ft.

ALABAMA COMPLETIONS

Wildcat—Greene County

L. M. Glasco's (E. C. Johnston's) No. 1 Willis, SW Section 11-20n-1e, dry and abandoned 2,610 ft.

MISSISSIPPI

Clarke County

Ark.-Miss. Oil Co.'s No. 1 Long Bell, C SW NE Sec. 35-3n-17e. Set 10¾-in. csg. 2,194 ft.; drlg. 4,887 ft.

Hinds County

Harvey Robinson and J. P. Frame's No. 1 Alford, SW SE Sec. 18-6n-1e. Set 10¾-in. csg. 750 ft.; drlg. ch. 2,993 ft.

Itawamba County

G. C. Grasty et al's No. 1 Ky. Lbr. Co., 1,320 ft. E, 660 ft. S, C Sec. 7-10s-10e. Twisted off D.S.; skd. 24 ft. S and spd.; set 10¾-in. csg. 170 ft.; S.O. 1,500 ft.; T. Trenton L. 1,600 ft.; tstd. sulf. wtr. 2,793-97 ft.; ran csg. to 2,795 ft. and shut off sulf. wtr.; bailed S.O. and some gas; T.D. 3,530 ft.; pulled and recmtd. 7-in. csg. 1,250 ft.; will perf. and acd. horizons at 360-570 ft. and 1,150-1,240 ft.; S.D.; W.O. acd.

Jefferson Davis County

J. W. Richardson's No. 1 M. Berry, C SW NE Sec. 15-9n-19w. R.U.

Kemper County

Crabb, Manning et al's No. 1 W. T. Caldwell, NW SE Sec. 25-9n-15w. 10¾-in. csg. 86 ft.; set 6-in. csg. 1,320 ft.; T.D. 1,640 ft.; acid. with 1,000 gal.; cg. 3,506 ft.

Leflore County

Exchange Oil Co.'s No. 1 Wildwood, SE SE NE Sec. 6-20n-1e. T. igneous section 5,312 ft.; T.D. 5,329 ft.

Madison County

Ralph A. Johnston's No. 1 F. H. Ray, C SE SW Sec. 6-8n-3e. T. chalk 4,568 ft.; Tuscaloosa sd. 6,145-51 ft., S.W.; drlg. 7,290 ft.

Oktibbeha County

Oktibbeha Oil & Gas Co.'s (Nick Shiarella) No. 1 L. L. Murphy, NE NE NW Sec. 28-17n-12e. Drlg. hd. L. 3,383 ft.

Scott County

E. L. Martin's No. 1 Newell Mineral Lse. Co., 660 ft. W, 330 ft. S, NE cor. Sec. 5-6n-7e. R.U.

Smith County

Haynes B. Owenby Drlg. Co.'s No. 1 State, C SE NE Sec. 6-2n-9e. Set 10¾-in. csg. 510 ft. (cor.); cg. 5,860 ft.

W. O. Allen's No. 1 Tom Henry, C W½ SW Sec. 4-7n-4w. Drk.

Wayne County

Tri-County Oil Co.'s No. 1 Jones, C SW SE Sec. 33-8n-7w. Drk.

W. E. Stewart's No. 1 Cora McRae, NW SW Sec. 23-24n-6e. Loc.

Yalobusha County

J. E. Green's No. 1 Walter-Goldman, 247 ft. SW cor. SE NW Sec. 23-25n-6e. Drlg. 475 ft.; cd. sds. 260-320 ft. and 400-68 ft.; T.D. 1,375 ft.; S.D.; plan to move in heavier equip.

Yazoo County

Leon Dunn's No. 1 H. H. Pepper, 1,024.5 ft. E, 330 ft. S, NW cor. Sec. 26-12n-2e. Set 9⅝-in. 611 ft.; S.D. 2,000 ft.

Leon Dunn's No. 2 H. H. Pepper, 1,224 ft. E, 990 ft. S, NW cor. Sec. 26-12n-2e. Set 9⅝-in. csg. 611 ft.; drlg. 3,226 ft.

Exchange Oil Co.'s No. 1 T. A. Bennett, SW SW SE Sec. 28-12n-2e. Set 10¾-in. csg. 513 ft.; drlg. ch. 4,295 ft.

Exchange Oil Co.'s No. 3 Wilburn, SW NE NE Sec. 31-12n-3e. Cd. 4,863-69 ft.; rec. 2 ft. good porous oil sd.; set 7-in. csg. 4,861 ft.; drlg. 4,871 ft.

Exchange Oil Co.'s No. 4 Wilburn, C NE SE NE Sec. 31-12n-3e. Cd. oil sd. 4,858-64 ft.; rng. electrical log.

Hassie Hunt's No. 2 Lammons, C SW NE Sec. 1-10-3. Drlg. 1,286 ft.

Hill & Hill's No. 1 W. A. Montgomery, C SE SW SE Sec. 24-12n-2e. Set 10¾-in. csg. 920 ft.; T.D. 4,420 ft.; cg. 4,896 ft.

E. C. Johnston's No. 4 Brumfield, Sec. 2-10-3. Drlg. 995 ft.

Slick-Urschel Oil Co.'s No. 7 Slick, 420 ft. N, 660 ft. E. SW cor. Sec. 36-11-3. Top chalk 4,667 ft.; cd. 5,386-5,426 ft.; rec. 17 ft. oil sd.; T.D. 5,441 ft.

C. L. Thompson, Rowan & Hope's No. 1 Joe Elliott-Mrs. Mary Edwards, 900 ft. S, 2,310 ft. W of NE cor. Sec. 30-10n-3w. Drlg. 5,752 ft.

Union Prod. Co.'s No. 2 Cesana, 774.8 ft. N, 619.1 ft. E, SW cor. Sec. 18-10-2. Set 16-in. csg. 32 ft.; 10¾-in. csg. 613 ft.; T.D. 758 ft.; drlg. sh. 4,430 ft.

Union Prod. Co.'s No. 2 Partridge, SE SE Sec. 1-10-3. Drlg. sdy. sh. and sd. 973 ft.

Union Prod. Co.'s No. 11 Stevens, 1,040 ft. SW cor. Sec. 12-10-3. Set 10¾-in. csg. 606 ft.; T.D. 4,950 ft.; D.S.T. 4,820-50 ft.; rec. 2,146 ft. oil, no wtr., in 16 min. with ⅝-in. chokes top and bottom; swbd. in; no gage.

Union Prod. Co.'s No. 4 J. M. Twiner, C NE NW Sec. 1-10-3. Set 10¾-in. csg. 593 ft.; drlg. sh. 4,293 ft.

Union Prod. Co.'s No. 5 Twiner, 2,019 ft. S, 2,118 ft. W, NE cor. Sec. 1-10-3. M.I.M.

ALABAMA

Marion County

Seaboard Oil Co.'s No. 1 Clark et al, 360 ft. W, 660 ft. N, SE cor. SE SW Sec. 28-11s-14w. Shot 638-45 ft. with 130 qt. nitroglycerin; crooked hole; skidded over; drlg. L.&sh. 577 ft.

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TULSA SAFETY HYDROMETER CASE
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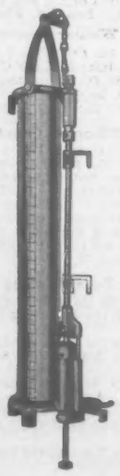
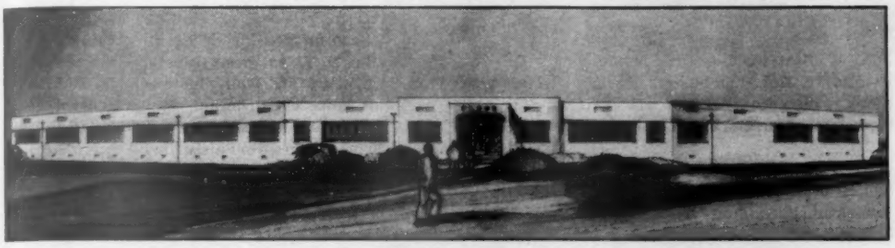


EQUIPMENT PROGRESS...

FLUOR SOON TO BE INSTALLED IN COMMODIOUS NEW HOME

Here is an artist's elevation of the new executive offices of the Fluor Corp., Ltd., to be completed soon on a 12½-acre site at 2500 South Atlantic Boulevard, Los Angeles, Calif. Fluor, which does engineering and construction work for the oil, gas, and allied industries, and designs and builds cooling towers, has let a contract for a group of factory buildings containing approximately 44,000 sq. ft. of floor space.



A one-story building of frame and stucco construction containing 10,000 sq. ft., will house the executive offices and the offices of the cooling-tower division and engineering and construction division. Three other buildings will contain the cooling-tower mill and pattern shop with 20,000 sq. ft. of space; the machine shop, with 4,000 sq. ft. and the construction-equipment warehouse with 10,000 sq. ft. These three buildings are to be of frame construction, with corrugated-iron sidewalls.

The executive offices will be paneled in redwood finish. A complete air-cooling and warm-air circulating system has been installed in the general office building. Total consideration for land and buildings is said to involve approximately $150,000 exclusive of new equipment.

Elastic Stop Nut in Its New Home

Elastic Stop Nut Corp. has moved its general offices from Elizabeth, N. J., to its new plant at 2332 Vauxhall Road, Union, N. J., a suburb of Newark. The new plant will be used exclusively for the manufacture of elastic stop self-locking nuts. All of the steel construction is fastened with bolts and elastic stop nuts, instead of rivets. It is announced also that the company's Houston, Tex., office has been moved to the Merchants and Manufacturers Building.

Varec Opens Branch Office in Tulsa

The Vapor Recovery Systems Co., Compton, Calif., manufacturer of Varec equipment, has opened a branch engineering and sales office in the Mayo Building, Tulsa, under the supervision of Alfred Katzenberg. This is a part of the expansion program undertaken by Frank V. Long, president, better to serve the petroleum industry in that area. Mr. Katzenberg is a graduate mechanical engineer of Missouri State University.

BUSINESS NOTES

Charles A. Spears, widely known among construction men and road builders, has resigned his position in the Caterpillar Tractor Co. sales department, to become director of sales development for one of the company's affiliates, LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

Effective the early part of June, the name "Bethlehem-International Supply Co." was officially changed to "Bethlehem Supply Co." Dropping of "International" marks a 2-year growth of this Tulsa company from an organization with a few scattered supply stores to the present Bethlehem Steel Corp. subsidiary with 36 stores strategically located throughout the Mid-Continent area.

The New York export office of Patterson-Ballagh Corp. has been removed from 39 Cortlandt Street to 22 Liberty Street, where enlarged quarters have been leased.

Diamond Power Specialty Corp., manufacturer of soot blowers, has appointed G. C. Kahl its representative in Kansas City, Mo. Mr. Kahl's office will be in the Dwight Building. He replaces L. S. Osborn, who died recently.

Union Wire Rope Corp. has appointed Robert B. Boand district salesman in Texas, with headquarters in Houston. Mr. Boand is a graduate of Missouri University, has been in office sales since 1937 and is a factory-trained man.

Plattner to Supervise Terminals

Fred. J. Plattner has been advanced to general superintendent of all terminals of the General American Tank Storage Terminal Division of the General American Transportation Corp. Mr. Plattner, who formerly was superintendent of the company's terminal in Cateret, N. J., will have charge of all terminals located in Cateret; New Orleans and Westwego, La.; Houston and Corpus Christi, Tex.

Murrin Is Appointed Postmaster

J. B. Murrin, for 17 years representing Larkin & Co., manufacturer of packers, sand pumps, and other oil-field equipment in the eastern territory and parts of Canada, has been appointed postmaster of Butler, Pa., and has resigned his position with Larkin. He will be succeeded by Roy A. Hindman, for several years in Larkin service.

AMONG EQUIPMENT MEN

Half Century of Service for Moody

A. A. Moody's half century of continuous service with the Jarecki Manufacturing Co. was commemorated recently in Erie, Pa., headquarters of the company, when 18 men, each with a long service record, attended a banquet in his honor. Mr. Moody, vice president and general manager of branches, has passed virtually his entire adult life with Jarecki. Alex Jarecki, president of the company, spoke appreciatively of Mr. Moody's years with the organization, and Mr. Moody talked interestingly of stores operated by Jarecki since the company was formed in 1852. The 18 men present represented 494 years of service.

Once when Mr. Moody was manager of a Jarecki branch in Toledo, Ohio, the office of mayor was vacant for a time, and he filled the post as acting mayor. When he was married in Toledo he and his bride were referred to as "the handsomest couple ever married in that city." They reside in St. Louis, Mo., where Jarecki's branch-store headquarters are located.

This is the "Cardwell Clipper," a Cessna T50 twin monoplane, used during the recent International Petroleum Exposition, Tulsa, to transport foreign visitors from the oil show to the plant of the Cardwell Manufacturing Co., in Wichita, Kans., and back. The trips, provided by Cardwell, included a 2-hour inspection tour of the plant. The T50, with seats for five, cruises 191 miles per hour, and is powered with two 225-hp. Jacobs engines, equipped with constant-speed propellers. The landing gear retracts. The luxurious ship has two-way radio and full blind-flight instrument group. Many oil-show visitors took the Wichita trip.

Personal Paragraphs

A. H. LLWYD, scout for the Exchange Oil Co. (Sinclair Prairie) at Mattoon, Ill., has been transferred to the land department and is moving to Evansville, Ind.

W. M. OHALEY and E. B. STONELEY, members of the Caribbean Petroleum Co.'s staff at Maracaibo, Venezuela, are spending several weeks in California on an extended vacation.

R. L. BLAFFER, chairman of the board of Humble Oil & Refining Co., Houston, Tex., has been named general chairman of Houston Allied Relief Fund, which has been established to coordinate all wartime appeals for relief made to Houston residents.

W. W. SIMPSON, scout for the Skelly Oil Co., Evansville, Ind., has been made district land man there, succeeding CECIL HUTCHINS, who resigned to enter the field of independents.

H. G. VESPER, of Standard Oil Co. of California, San Francisco, has been appointed member of the American Petroleum Institute Division of Marketing committee on lubrication. Mr. Vesper succeeds C. S. LINCOLN.

IRVING K. PECK, president of Home Natural Gas Co., headed a delegation appearing before the Pennsylvania Public Utility Commission at Harrisburg last week asking for permission to extend transmission facilities in Pennsylvania.

DR. RALPH F. NIELSON and JOHN A. CHAMBERLAIN recently joined the research staff of the School of Mineral Industries at Pennsylvania State College to engage in water-flood recovery investigations.

MAYNARD C. DAVIES, president and general manager of Davies Petroleums, Ltd., Calgary, Alta., since its inception, has resigned, but will continue with the company as vice president. LEONARD PHILLIPS succeeds him as president and managing director.

DAVID A. YOUNG, assistant to W. B. CHENAULT, head of the Sinclair Refining Co.'s plant in Wellsville, N. Y., has been transferred to the Houston, Tex., plant. Mr. Young had been Mr. Chenault's assistant since construction of the local plant in 1929. Succeeding him is J. N. YOUMANS of Coffeyville, Kans., who previously had been identified with refineries in Sand Springs, Okla., and East Chicago, Ind. Mr. Young served two terms as president of Wellsville's Chamber of Commerce.

CHAIRMAN LAWRENCE VANDER LECK, of the Central Committee of California Oil Producers, who succeeded J. R. PEMBERTON as California oil umpire last month, has resigned, but members of the committee are attempting to have him reconsider his resignation and remain as chairman of the committee and oil umpire.

T. K. KNOX, chief geologist of Republic Natural Gas Co., at Dallas, Tex., made a tour of inspection of the company's holdings in Southwest Texas last week.

W. O. WOODWARD, land man with the H. L. Hunt interests, has been placed in charge of a new office opened in the City Bank Building, Shreveport, La.

E. M. KASE, formerly an industrial oil salesman in Philadelphia, Pa., for the Gulf Refining Co., has been made superintendent of its ocean terminal at Norfolk, Va.

HARRY NORRIS, scout with Sinclair Prairie Oil Co., has been transferred from Shreveport, La., to Illinois. He is succeeded in Shreveport by JEFF HAWKS, who was moved from East Texas.

E. W. BECK, purchasing agent of General Petroleum Corp., with offices in the Higgins Building in Los Angeles, Calif., has been elected second vice president of the Purchasing Agents Association of Los Angeles, Inc.

HENRY L. O'BRIEN, first vice president of Cities Service Co., was elected a director of Arkansas Natural Gas Corp. to succeed the late Henry L. Doherty at a meeting of the company June 20.

J. V. FRITZ, formerly with Magnolia Petroleum Co. in its Houston, Tex., office for the past 2 months located at Bowie, in North Texas, has been made a land man for the company in its Wichita Falls, Tex., office.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

The deepest well in the world is in Silesia in the German empire. It is 7,350 ft. deep. It was sunk with a diamond drill to test coal measures. The deepest American well is drilling near McDonald, Pa., at 7,174 ft.

Burt H. Collins, Tulsa oil producer, and Miss Lucy Alma Byron of Bradford, Pa., were married on June 22 in the latter city.

20 YEARS AGO

A federal grand jury in New York indicted 50 individuals on charges of using the mails to defraud. They were promoters of "oil" stocks, and brokers who allegedly handled the trades with the innocent public.

Sir E. Mackay Edgar's recent statement that "within the next 10 years Great Britain will be in control of the oil industry of the world" is causing embarrassment to other British oil men and amusement on this side of the Atlantic.

The Ohio Cities Gas Co. will change its name to the Pure Oil Co., effective July 1. The company has assets aggregating more than $131,600,000, and is a producer, refiner, transporter, and marketer.

10 YEARS AGO

D. S. Wakenight, for 45 years active as an oil writer for the P. C. Boyle publications, retires.

Texas produces 870,000 bbl. of crude oil daily; Oklahoma 666,000 bbl.; California 603,500 bbl., and all other oil states 479,490 bbl.

Sir Frederick W. Black, noted British oil man, dies at the age of 67.

Paul Griffin, for 11 years in the service of the Oklahoma Pipe Line Co., has been elected vice president of the company.

BARNEY FISHER, formerly geologist with Geophysical Service, Inc., Dallas, Tex., is now geologist for the Coronado Oil Corp., Dallas.

E. D. RUSE, drilling superintendent for Sells Petroleum Co. in Mississippi, is recovering from injuries sustained in an automobile accident near Jackson recently.

MAJ. J. R. PARTEN, president of Woodley Petroleum Co., Houston, Tex., has been named permanent vice chairman of the National Defense Aviation Board of Texas.

GENE O'CONNOR, scout with Pure Oil Co., has been transferred to the Shreveport district. He formerly was stationed at Odessa, Tex., and for the past 2 months was in the land department of the Fort Worth office.

J. E. BEACH, son of F. K. Beach of the Alberta Lands and Mines office at Calgary, is leaving Toronto, Ont., for Trinidad, British West Indies, where he will be assistant engineer to Trinidad Leaseholders, Ltd.

J. A. CULBERTSON, geologist for Continental Oil Co. at Houston, Tex., was a guest of the Corpus Christi, South Texas, Geological Society last week, where he delivered a paper on the "Downdip Wilcox of Coastal Texas and Louisiana."

WILLIAM S. SCULLY, who for the past 4 years has served as general counsel and general manager of the Independent Refiners' Association of California, Inc., has resigned as general manager to engage in the practice of law, but will remain as general counsel.

JOSEPH E. MORERO, chief geologist of the Skelly Oil Co., Tulsa, is spending his vacation in southern California.

W. B. OMOHUNDRO, prominent Wichita Falls, Tex., independent operator, returned last week from a business and pleasure trip to Washington, D. C., and the World's Fair in New York.

JOHN J. CHRISTMANN has resigned his position as petroleum engineer for the State of Michigan to establish himself as a consulting geologist and petroleum engineer in Lubbock, Tex.

R. V. WARD, has succeeded J. D. DAVIES as petrographer with the Kansas district of Shell Oil Co., Inc. Mr. Davies has been transferred to the Wichita Falls, Tex., district of Shell where he is in charge of the sample laboratory.

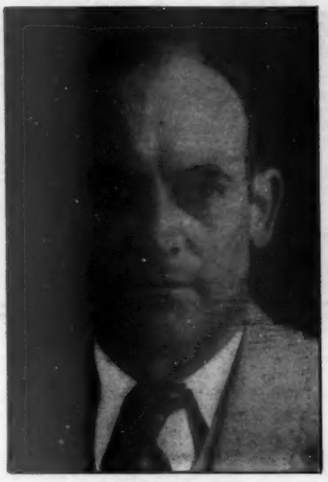
DR. W. C. MENDENHALL, director of the U. S. Geological Survey, Washington, D. C., has been appointed by HAROLD L. ICKES, secretary of the interior, to head the oil resources division of the new Defense Resources Committee.

JOHN L. RICH, formerly a consulting geologist of Ottawa, Kans., and then editor of the Bulletin of the American Association of Petroleum Geologists, is now director of geology and geography in the University of Cincinnati.

C. A. DICKEY, Texas Oil Co., seismograph expert, of Houston, Tex.; Mrs. Dickey, and their 6-month-old daughter, Sandra, arrived in New York Sunday from Egypt. They were among 184 Americans on the vessel leaving the war zone.

Fills Newly Made Post

J. A. Bonham, formerly manager of the land department, has been appointed manager of all operations of the Union Sulphur Co., Sulphur, La., a newly created post. Organized originally to engage in the sulfur business, the company now is one of the leading independent oil producers in coastal Louisiana, where most of its holdings are located. Mr. Bonham has been associated with Union Sulphur since April 1, 1937. Before that he was manager of the Magnolia Petroleum Co.'s land department in the Lake Charles, La., district. He has continued to reside in Lake Charles, which is within 10 miles of the company headquarters in Sulphur.



J. A. BONHAM

Mr. Bonham began work in the oil fields in 1912 as an employe of the Gulf Refining Co. of Louisiana in the Shreveport district. Since then he has been actively engaged in oil developments in Arkansas, Texas, Louisiana, and Mexico, except for 2 years spent as an air-service lieutenant in the World War.

Since 1928, when he entered the land department of the former Vacuum Oil Co., with headquarters in Houston, Tex., Mr. Bonham has devoted most of his time to South Louisiana development. When the Vacuum Oil Co. and Magnolia Petroleum Co. were merged in 1932 he moved to Lake Charles, in charge of land work for the combined companies in that area, the position he held until he went with the Union Sulphur Co.

A. I. LEVORSEN, consulting geologist, of Tulsa, a past president of the American Association of Petroleum Geologists, has gone to Ely, Minn., with his family to spend the hot season in their summer home.

HAROLD BROWN, formerly in the production department of the Phillips Petroleum Co. in Oklahoma City, Okla., has been transferred to Bartlesville, Okla., to serve as secretary to DON R. KNOWLTON, production manager.

R. E. ADAMS, proration engineer with the Cities Service Oil Co., Inc., in Wichita, Kans., has been transferred to the Bartlesville, Okla., general office where he will continue his present duties besides handling special proration analysis assignments.

COL. ERNEST O. THOMPSON, Texas railroad commissioner, headed a group of speakers at the conservation program meeting of Sul Ross State College, Alpine, Tex. He gave an address on industrial and commercial phases of Texas' oil industry.

A. R. EPPENAUER, American World War veteran and millionaire oil man, has changed the name of his Davis Mountain ranch, near San Angelo, Tex., from Swastika ranch to I Bar ranch. Mr. Eppenauer explained he had used the Indian symbol of good luck, which easily could be confused with the swastika of Nazi Germany. He formerly operated from San Angelo and Fort Worth and still has Southwest oil interests with headquarters in Pecos, Tex. He stays on the Jeff Davis County ranch when he is not at the race tracks with a string of the horses he raises.

DEWEY E. FOSTER, organizer of the Wisconsin Oil Refining Co., which plans a $700,000 plant in Sheboygan, Wis., has been elected president and general manager. WALTER H. WINGROVE, head of Wingrove Oil Co., Sheboygan, is vice president, and JOHN HERONYMUS, Sheboygan investment banker, secretary-treasurer. Directors in addition to the officers are G. BRITTON McKINLEY, JOHN CRAWFORD, and THOMAS H SPENCE.

Shifts: CHARLES TARR, engineer, Continental Oil Co., from Wesco, Calif., to Avenal, Calif.; EDWARD A. HALL, geologist, Long Beach Oil Development Co., from Berkeley, Calif., to Sonora, Calif.; D. B. FERGUSON, JR., president, Mid-Continent Well & Drilling Co., from Fairfield, Ill., to Carmi, Ill.; W. HARLAN TAYLOR, superintendent, Petty Geophysical Co., from Jackson, Miss., to Houston, Tex.; T. J. COYNE, secretary and treasurer, Conroe-Wilcox Minerals, Inc., from Gulfport, Miss., to Memphis, Tenn.; L. DANNECKER, manager, Socony-Vacuum Oil Co., Inc., from New York City to Yonkers, N. Y.; CLIFF HODGES, superintendent, Halliburton Oil Well Cementing Co., from Charleston, W. Va., to Casper, Wyo.; C. W. STROTMAN, superintendent, Blackstock Oil & Gas Co., from Ada, Okla., to Keensburg, Ill.; WILLIAM J. DEVANEY, engineer, Cities Service Oil Co., from Bartlesville, Okla., to Ponca City, Okla.; RAY MAYHALL, engineer, Col-Tex Refining Co., from Oklahoma City to Lawton, Okla.; ERNEST OBERING, geologist, Shell Oil Co., Inc., from Tulsa to Evansville, Ind.

GEORGE PRUSSING, of Union Oil Co., and F. A. ALLEN, of the Pacific Coast branch of the American Gas Association Testing Laboratories, will present papers and lead discussions at the first annual Pacific Coast Liquefied Petroleum Gas Exposition to be held in Santa Barbara, Calif., June 27 and 28.

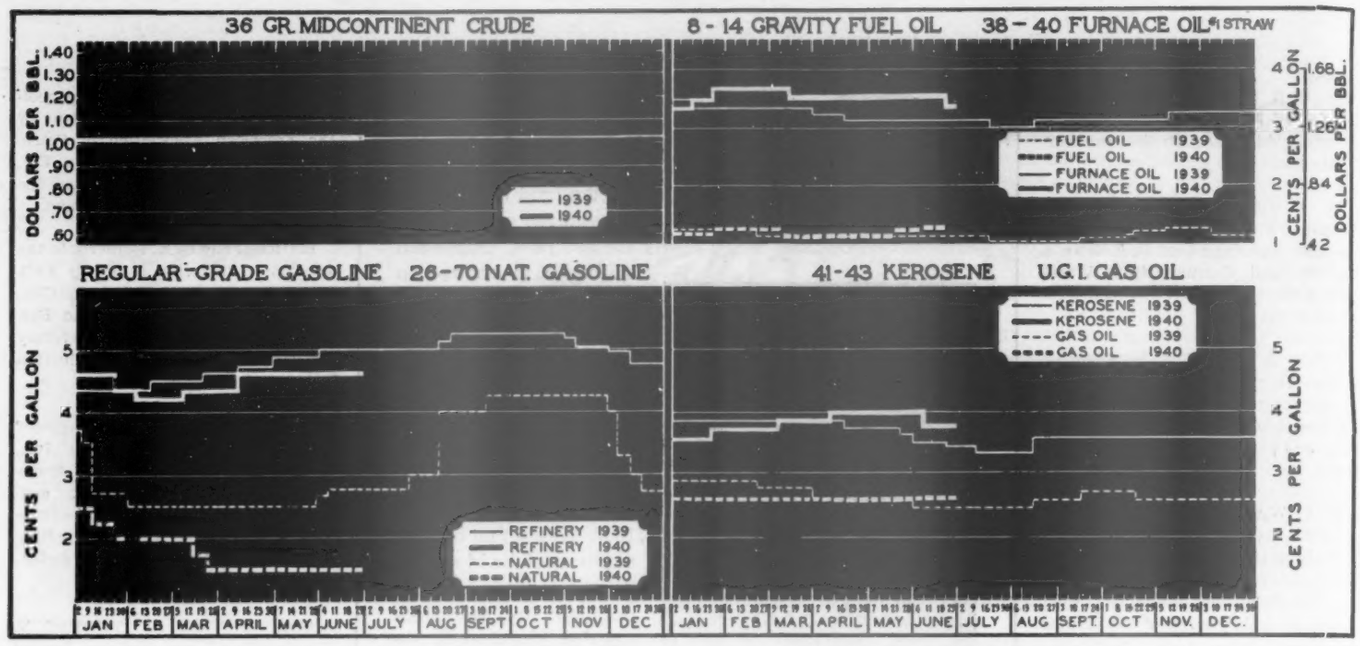
G. F. BREIDENBACH is the new cashier in the general office of Cities Service Oil Co., Bartlesville, Okla., succeeding Frank Johnson, who died last month. S. M. SWEENEY is assistant cashier. GERALD R. PRESTON has been named assistant treasurer. He was formerly budget manager.

J. J. FROMMER, formerly production superintendent in Houston, Tex., has been transferred by Ohio Oil Co. to Shreveport, La., as general superintendent of the Shreveport district. GLENN BISH, formerly an employe of Ohio's gasoline plant in Haynesville, La., succeeds Mr. Frommer in Houston.

DR. FREDERICK G. CLAPP, consulting geologist of New York, delivered an illustrated lecture Monday evening, June 17, before the Dallas Petroleum Geological Society at the Petroleum Club, Dallas, Tex. His subject was modern oil exploration in Afghanistan.

KEN WARD, of Amco Corp., won the principal prize, second leg on the club trophy cup, in the golf tournament of the Chicago Oil Men's Club at the Riverside Golf Club last week. H. JENSEN, Spencer Petroleum Co., was second and E. YOUNGBERG, Pana Refining Co., third. The tournament drew an attendance of 118.

T. E. SWIGART, recently named president of the Shell Pipe Line Corp., gave a congratulatory address before 7,500 persons who gathered in Rock Island, Tex., last Thursday to celebrate the discovery of oil in commercial quantity in Colorado County. Oil executives and others from throughout Texas, along with many from outside the state, joined in a jollification over the Shell Oil Co., Inc.'s strike from the Wilcox formation near Sheridan. JOHN L. SHEPARD was program chairman and J. G. JENKINS general chairman. An honor guest was A. J. COYLE of San Antonio, Tex., veteran oil man and Colorado wildcatter.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Heating Oils and Lubricants Lower in Group 3 Area; Gasoline Stands Still

By T. F. SMILEY

REFINERS in the Group 3 area couldn't find much to feel cheerful about without eyestrain this week. Lubricating oils were down. Heating oils and tractor fuels were slipping. Gasoline consumption was soaring, but it didn't mean a thing on the price graph.

Gasoline stocks, a burdensome accumulation that has been the principal market depressant for months, recorded their first sharp drop of the season in the week ended June 15, declining 1,811,000 bbl. Mid-Continent stocks contributed to the better showing, going down 162,000 bbl.

Swamped With Unprofitable Orders

Refiners generally reported a stream of orders. In addition to the usual seasonal rise in demand and the preparation for Independence Day requirements, jobbers were filling every available inch of storage space in order to get the extra half-cent available through buying before the imposition of an addition to the federal tax.

"We are swamped with orders," said one sales manager. "Our plants are sold up for the rest of June, and we shall have to buy some 150 cars in the spot market to complete our June deliveries." Others reported similar conditions. But the only ones making any money, they said, were refiners who sold in nearby districts, by truck.

Further weakening of the lubricant market in the East had its inevitable effect on the Mid-Continent market, although refiners said there was no serious lack of balance between supply and demand in the latter area. As a matter of fact there has been no dearth of outlets for Mid-Continent lubricants throughout the whole period of descending prices, which began last February, cutting 8 cents from bright-stock quotations and 4½ cents from neutral.

Refined Oil Market Barometer

Notwithstanding sharply rising consumption, prices of gasoline are soft, and refiners see little prospect of getting this division of the market on a paying basis. Gulf Coast quotations off. Heavy industrial fuels present a more encouraging outlook, both demand and quotations displaying increased firmness. Lubricating oils suffered a further decline.

MID-CONTINENT. Gasoline active, but prices unchanged. Light fuels and lubricants soft.

EAST COAST. Gasoline soft. Light fuels steady and residual fuels gaining.

GULF COAST. Gasoline prices break. Kerosene, light fuels and diesel oils down.

PENNSYLVANIA. Gasoline steady. Bright stocks and neutrals off. Kerosene inactive.

CALIFORNIA. Gasoline fractionally lower. Gas oil and diesel prices down. Market quiet.

CHICAGO. Gasoline in brisk demand, but prices show no response. Heavy fuels strong.

Refiners reporting to the Western Petroleum Refiners Association shipped 164,520 bbl. of bright stock in April. This was 31,621 bbl. (23.8 per cent) over March. It was 24,447 bbl. (17½ per cent) over April 1939. For the first 4 months of the year total bright-stock shipments of these refiners were 558,329 bbl. This was 148,310 bbl. (36.2 per cent) over the comparable period of 1939. Shipments for the 12 months ended April 30 were 1,776,263 bbl. This was 407,824 bbl. (29.8 per cent) higher than was recorded in the year ended April 30, 1939.

Neutrals told a like story. April shipments were 180,294 bbl. This was slightly under the March shipments, but it was 33,723 bbl. (23 per cent) above the record for April 1939. For the first 4 months of 1940 the neutral shipments were 680,513 bbl. This was 82,714 bbl. (13.8 per cent) more than in the comparable period of 1939. Neutral shipments for the 12 months ended April 30 were 2,030,362 bbl. This was 350,568 bbl. higher than the figure for the year ended April 30, 1939.

Notwithstanding their fairly favorable statistical position, Mid-Continent lubricating oils are sensitive to fluctuations in the quotations in the eastern market, owing to competitive conditions.

Heating Oils and Tractor Fuels Off

Heating oils slumped, with quotations off an eighth all through the list. Refiners had felt hopeful that prices had reached bottom for the season. Many jobbers, however, seem to be waiting out the market, believing that bargains are more likely to appear in July than in June. Their occupancy of seats on the sidelines has tended to increase the size of inventories, and a break in prices in Minneapolis had a softening effect on the market throughout the Group 3 selling territory.

Tractor fuels too lost an eighth, with movement slow. Unfavorable weather for farming operations was blamed largely for dullness in this division of the refinery market. Kerosene was weaker, but prices showed little change.

Natural gasoline disclosed the same discouraging picture it has presented for weeks. Offerings of manufacturers with plants located disadvantageously with reference to freight rates were even more urgent than in the preceding week.

Heavy oils were firmer.

Softening Motor-Fuel Market Reported on East Coast

By H. STANLEY NORMAN

NEW YORK, June 24.—Tank-car motor-fuel prices were reduced three-tenths of a cent per gallon in the northeastern section of the country last week and tank-wagon quotations dipped three-tenths to a half cent in sympathy with the previous declines on the Gulf Coast. The reductions instituted June 20 by Socony-Vacuum Oil Co., Inc., applied generally throughout New England and the State of New York, except the western part where lower prices were posted on June 14.

The motor-fuel price reductions also reflected to some extent the softer tanker-chartering market which has developed during the past 2 or 3 weeks. American flag boats are now more severely restricted in trans-Atlantic movement than at any previous time in the war period. While not many American tankers have operated in trans-Atlantic trade even since Europe went to war there have been enough boats thrown back on the coastwise market by extension of the neutrality-law prohibitions to Mediterranean and Spanish ports to depress domestic rates.

Gulf Coast refiners are willing to accept 4 cents per gallon for 65-octane motor fuel and 68-70 material can be purchased in cargo quantities at 4⅛ cents.

Residual and light fuel oils are holding their market positions without difficulty. The industrial fuels are throwing up a particularly strong resistance to depressing influences of the off season largely because of the prospect for increased demand as manufacturers swing into the defense program. Rearmament plans have not yet gained sufficient momentum to show the full impact of defense preparation on demand, but industry is casting about for supplies of raw materials and this activity alone has a healthy psychological influence on the residual fuel-oil market.

Motor-fuel demand in the State of New York, the largest consumer in the nation, continues to set new peaks as the year progresses, despite the inclement weather during the first 5 months. Total motor-fuel consumption, including nontaxable sales, for the month of April in New York State were reported from Albany last week at 148,044,381 gal., a gain of 271,869 gal. over the corresponding figure last year. This year's gain in April was more than 3,000,000 gal. in motor fuel subject to taxation.

Tanker-charter rates are definitely on the skids, judging from fixtures reported in the marine trade of New York Harbor last week. An open charter was made recently for the coastwise voyage for 30 cents per barrel on fuel oil. The last charter reported for movement of gasoline from the Gulf to North Atlantic ports was 42 cents per barrel. During the latter stages of the winter boat owners were obtaining as high as 70 cents per barrel for dirty tonnage on the coastwise run and gasoline cargoes brought a top of 56 cents per barrel.

Eastern oil men expressed belief last week that the new Texas proration order imposing Sunday producing holidays in July and August and a reduction of more than 17,000 bbl. in the daily output of Southwest Texas fields would help materially in halting declines in markets. They did not anticipate that products will respond immediately, or, for that matter, even in the near future, but considered the results will be beneficial over a longer range.

The psychological benefit accruing to the residual fuel-oil market from the prospective spread of industrial activity was apparent in Gulf Coast quotations. Refiners who previously expressed interest in bids at 75 cents per barrel for cargo business in Bunker C material are now generally quoting 78 to 80 cents and the asking price scales up to 85 cents per barrel. While the reduced production schedule in Texas will prove beneficial in lowering motor-fuel inventories, there are several refiners who would prefer to continue higher operating schedules for the sake of fuel-oil production. In view of the prospective limitation of raw material the incentive to store fuel oil against next winter's demand at higher prices becomes even stronger.

There were no material changes reported in the New York market last week, excepting that rumors became more widespread that low-octane motor fuel could be purchased in several directions at 5.5 cents per gallon in barges. A numerical majority of sellers, however, reported that 65-octane motor fuel was moving at 5.75 cents to barge resellers and from 6 to 6.25 cents to the tank-car trade. Kerosene and other light fuel-oil prices remained unchanged from the reduced levels instituted late in May and the early part of June.

Western Pennsylvania refiners report lubricating-oil shipments against domestic contracts have gained momentum, but that export orders are still lacking. Prices from the preceding week held. The comparatively strong domestic demand is seized upon by some analysts as evidence of the greater industrial activity, impact of which will not be registered on other products if normal trends are followed, for 30 to 60 days.

Eastern and middle-western steel mills are reported operating at 100 per cent capacity and this alone goes hand in glove with the stronger prices asked in primary markets for residual fuel oils. Movement of the raw steel to points of defense-material manufacture will get into full swing as rapidly as contracts can be awarded in Washington and the producers can tool their factories for production.

This phase of the national program will bring another rise in petroleum demand, unless close students of the oil industry's relationship to general business are deceived. Reduced marine consumption of petroleum, caused by closing of practically all European ports to American shipping, is still a factor in the market, but the prospective domestic-demand increase overshadows that loss. One of the factors behind recent reductions in tanker rates is the expiration of short-term charters closed at the outset of the war when practically all suppliers grabbed for boats to transport products for which the demand did not materialize in Europe.

A.P.I. Weekly Refinery Statistics

Week Ended June 22, 1940

	Capacity reporting (per cent)	Total gasoline stocks (bbl.)	Residual fuel-oil stocks (bbl.)	Gas oil and distillate stocks (bbl.)	Daily crude runs (bbl.)
East Coast	100.0	23,206,000	8,844,000	9,526,000	606,000
Appalachian	91.0	3,672,000	561,000	336,000	116,000
Ind., Ill., and Ky.	89.5	16,586,000	3,296,000	3,595,000	592,000
Okla., Kans., and Mo.	76.9	7,502,000	2,079,000	1,156,000	282,000
Inland Texas	59.6	1,912,000	1,448,000	304,000	119,000
Texas Gulf	85.3	14,738,000	5,611,000	4,889,000	835,000
Louisiana Gulf	97.6	2,615,000	1,117,000	1,062,000	116,000
N. Louisiana and Ark.	51.5	537,000	462,000	270,000	42,000
Rocky Mountains	55.5	1,497,000	605,000	144,000	46,000
California	87.3	17,966,000	78,440,000	9,924,000	547,000
Total reported	85.1	90,231,000	102,463,000	31,206,000	3,301,000
Est. unreported	.....	7,045,000	2,220,000	1,545,000	389,000
*Est. total	.....	97,276,000	104,683,000	32,751,000	3,690,000
*Est. total previous wk.	.....	97,660,000	104,419,000	31,886,000	3,620,000
*June 23, 1939	.....	81,462,000	112,199,000	30,658,000	3,430,000

*Bureau of Mines.

Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATE)

Week ended June 15, 1940	259,800,000 barrels
Week ended June 8, 1940	259,706,000 barrels
Week ended June 10, 1939	274,852,000 barrels

Figures do not include stocks of heavy, unrefinable California crude.

Gulf Coast Markets

HOUSTON, Tex., June 24.—A firmer tone was evident in fuel oils on the Gulf Coast the past week, but gasoline quotations eased off from an eighth to a quarter-cent. Bunker C fuel seemed firm around 80 cents with several cargoes being moved out at that price, all coastwise.

Firming of fuel was attributed to a combination of factors, including an increased industrial demand in the East, a drastic reduction in tanker rates, and the near completion of Venezuela reduced tariff oil quotas. The increased industrial demand is occasioned partly by the launching of the Government's national defense program, and on this basis Gulf Coast suppliers feel the strengthening of fuels may be extended.

A number of good inquiries for No. 2 fuel (gas oil) also have been received although no important sales have been actually consummated. Sellers generally are quoting from

(Continued on Page 159)

Retail Oil Markets

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of June 25, 1940

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county, and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Dir.	Incl. tax	tank wag.
Chicago, Ill.	15.1	13.1	4.0	10.0
Decatur	13.6	12.1	4.0	9.5
Joliet	15.1	13.6	4.0	10.0
Peoria	15.1	12.7	4.0	10.0
Quincy	14.9	13.4	4.0	9.8
Davenport, Ia.	15.1	13.6	4.0	†10.0
Des Moines	14.9	12.4	4.0	†9.8
Mason City	15.3	13.8	4.0	†10.2
Duluth, Minn.	16.9	15.4	5.0	10.8
Mankato	16.5	15.0	5.0	9.0
Minneapolis	16.5	13.5	5.0	10.4
LaCrosse, Wis.	16.5	15.0	5.0	10.4
Green Bay	16.9	15.4	5.0	10.3
Milwaukee	16.3	14.8	5.0	10.2
Detroit, Mich.	13.6	12.1	4.0	7.6
Grand Rapids	13.2	11.7	4.0	9.0
Saginaw	14.2	12.7	4.0	9.3
Evansville, Ind.	16.6	15.1	5.0	†10.5
Indianapolis	16.8	14.3	5.0	†10.2
South Bend	16.8	15.3	5.0	†10.2
Fargo, N. D.	17.7	16.2	5.0	11.6
Huron, S. D.	17.0	15.5	5.0	10.9
Kans. City, Mo.*	14.4	12.9	4.0	8.0
St. Louis*	14.7	12.7	4.0	8.0
St. Joseph	14.4	12.0	4.0	7.9
Wichita, Kans.	13.3	11.6	4.0	7.0

*State tax 2 cents, 1-cent city tax, and 1-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gal. or more, 1.5 cents off; minimum delivery 25 gal.

Stanolex Fuel Oil in Chicago

Effective April 18, 1940, f.o.b. Chicago, tank-wagon prices: Standard heater oil, 1-99 gal., 8.75 cents; 100-149 gal., 7.75 cents, 150 gal. and over, 7.25 cents. Stanolex fuel oil No. 1, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7 cents; 400 gal. and over, 6.5 cents. Stanolex furnace oil, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7 cents; 400 gal. and over, 6.5 cents. Stanolex fuel oil A, 1-399 gal., 5.5 cents; 400-799 gal., 4.5 cents; 800 gal. and over, 4.25 cents. Stanolex fuel oil B, 1-399 gal., 5.5 cents; 400-799 gal., 4.5 cents; 800 gal. and over, 4.25 cents. Stanolex Bunker C fuel oil, 1-999 gal., 4.25 cents; 1,000 gal. and over, 3.25 cents.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Cons'r tank wag.	Di-vided dlr.	Incl. tax	tank wag.
Ohio points	15.5	14.5	5.0	*9.0

*Includes state tax of 1 cent.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Cons'r tank car	Dir. tank wag.	Incl. tax	tank wag.
Atl'tic City, N. J.	11.6	12.7	4.0	8.4
Newark	11.6	12.7	4.0	8.4
Annapolis, Md.	13.35	14.35	5.0	9.5
Baltimore	12.75	13.75	5.0	9.0
Cumberland	14.15	16.15	5.0	10.0
Wash'gton, D. C.	11.00	12.00	3.0	9.5
Danville, Va.	14.95	17.45	6.0	11.5
Norfolk	13.75	16.25	6.0	11.0
Petersburg	14.05	16.55	6.0	11.7
Richmond	14.05	16.55	6.0	11.0
Roanoke	15.25	17.75	6.0	11.0
Charles'n, W. Va.	14.55	17.05	6.0	12.6
Parkersburg	13.35	15.35	6.0	11.2
Wheeling	14.85	16.75	6.0	11.8
Charlotte, N. C.	16.90	18.40	7.0	11.8
Hickory	17.45	18.95	7.0	12.3
Mt. Airy	17.30	18.80	7.0	12.2
Raleigh	16.65	18.15	7.0	11.5
Salisbury	16.95	18.45	7.0	11.9
Charleston, S. C.	14.75	17.25	7.0	9.25
Columbia	15.60	18.10	7.0	11.5
Spartanburg	16.30	18.80	7.0	12.2

Price basis to Essolene undivided dealers: Dealer tank-wagon price less 0.5 cent per gallon. Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gal., consumer tank-wagon price at time and place of delivery; 100,000 gal. per year, consumer tank-car price plus 0.5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less 0.5 cent per gallon.

Effective January 16, 1939, in North Carolina the commercial consumer schedule became as follows: Single deliveries of 50 gal. or more, consumer tank-wagon price. Single deliveries of less than 50 gal., 4 cents per gallon over consumer tank-wagon price. Generally the posted consumer tank-wagon price will be equivalent to the dealer price, less 0.5 cent per gallon. The above policy also applies in South Carolina, effective January 23, 1939.

Discounts for kerosene, 1 cent off tank-wagon price for 25 gal. or more under contract (contract not necessary in Baltimore), except no discount in New Jersey.

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline			Kero.
	Cons'r tank wag.	Net dlr.	Incl. tax	tank wag.
Atlanta, Ga.	16.0	16.0	7.0	10.0
Augusta	17.0	17.0	7.0	10.0
Macon	16.5	16.5	7.0	10.0
Savannah	16.0	16.0	7.0	9.0
Birmingham, Ala.	17.5	17.5	8.0	9.0
Mobile	17.5	17.5	9.0	8.0
Montgomery	18.0	18.0	9.0	9.0
Jackson, Miss.	16.0	16.0	7.0	9.5
Vicksburg	16.0	16.0	7.0	9.0
Jacksonville, Fla.	15.5	15.5	8.0	8.0
Miami	15.5	15.5	8.0	8.0
Pensacola	17.5	17.5	9.0	8.5
*Tampa	20.0	17.0	8.0	8.0
Lexington, Ky.	15.5	15.5	6.0	10.0
Covington	14.5	14.5	6.0	9.5
Louisville	14.5	14.5	6.0	9.0
Paducah	15.0	15.0	6.0	9.0

Price basis to tank-wagon consumers, effective January 4, 1937, 3 cents per gallon below tank-wagon price.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola, Fla., has a city gasoline tax of 1 cent. All are included in the table.

*Temporary discounts to tank-wagon consumers in Tampa 3 cents per gallon below consumer tank-wagon price on Crown gasoline.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline			Kero.
	Cons'r tank car	Dir. tank wag.	Incl. tax	tank wag.
Albany	11.2	13.0	5.0	7.9
*Met. N. Y.: Manhat., Bronx, Queens, Brklyn., Staten Island	11.7	12.5	5.0	8.2
Buffalo	12.3	13.1	5.0	8.0
Rochester	12.8	13.7	5.0	8.5
Syracuse	12.2	13.4	5.0	8.7
Portland, Me.	11.2	13.3	5.0	8.0
Manchester, N.H.	11.9	12.0	5.0	8.8
Burlington	11.9	14.0	5.0	8.5
Boston, Mass.	10.3	11.3	4.0	8.3
Worcester	10.8	11.6	4.0	8.4
Hartford	10.5	11.5	4.0	8.1
New Haven	10.4	11.4	4.0	8.1
Providence, R. I.	10.2	11.7	4.0	8.3

*Does not include 2 per cent city sales tax, which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Effective February 15, 1939, the company changed its commercial consumer policy in New York and in New England points for tank-wagon delivery to the following: Annual purchases 10,000 gal. and under, tank-car price plus 2 cents per gallon; annual purchases 10,000 gal. up to 50,000 gal., tank-car prices plus 1.5 cents per gallon; annual purchases 50,000 to 200,000 gal., tank-car price plus 1 cent per gallon; annual purchases 200,000 gal. and over, tank-car price plus ½ cent per gallon. Private consumers pay undivided dealer price, plus 2 cents per gallon. Private consumers receiving full compartment deliveries of at least 200 gal. receive a discount of ⅛ cent per gallon.

Pennsylvania and Delaware

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Cons'r tank car	Dir. tank wag.	Incl. tax	tank wag.
Philadelphia, Pa.	12.0	13.5	5.0	10.5
Pittsburgh	13.0	14.5	5.0	10.5
Allentown	13.0	14.5	5.0	10.5
Erie	13.0	14.5	5.0	10.0
Scranton*	12.5	14.0	5.0	10.5
Altoona	13.0	15.0	5.0	10.5
Dover, Del.	...	14.0	5.0	10.5
Wilmington	...	13.5	5.0	10.0

Price basis to undivided dealers, dealer tank-wagon price less 0.5 cent per gallon.

Discount on kerosene, 2 cents per gallon off tank-wagon price on tank-wagon deliveries of 25 gal. or more at one time.

*Voluntary discount of 1 cent allowed to dealers only.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline			Kero.
	Tank truck	Serv. sta.	Incl. tax	tank wag.
San Francisco	16.0	17.0	4.0	11.5
Los Angeles	15.5	16.5	4.0	10.0
Fresno, Calif.	17.0	18.0	4.0	12.5
Phoenix, Ariz.	20.0	21.0	6.0	*17.5
Reno, Nev.	19.0	20.0	5.0	13.5
Portland, Ore.	18.5	19.5	6.0	13.5
Seattle, Wash.	18.5	19.5	6.0	13.5
Spokane	20.0	21.0	6.0	16.5
Tacoma	18.5	19.5	6.0	13.5

*Includes 5-cent state tax.

Discount to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents. To commercial consumers: On tank-wagon price; on single deliveries of 40 gal. and over, advance quantity discount extended at time of delivery, 3 cents. Service-station schedule applies on single deliveries less than 40 gal. On kerosene in tank-car, transport-truck, and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank wagon.

March 18, 1939, split dealer discount was canceled.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Tank wag.	Dir.	Incl. tax	tank wag.
Denver, Colo.	13.0	...	5.0	10.5
Grand Junction	17.5	...	5.0	12.5
Pueblo	15.0	...	5.0	9.0
Casper, Wyo.	16.5	...	5.0	11.5
Cheyenne	14.0	...	5.0	11.0
Billings, Mont.	18.0	...	6.0	12.0
Butte	15.0	...	6.0	13.0
Great Falls	18.0	...	6.0	12.0
Helena	16.0	...	6.0	12.5
Salt Lake, Utah	15.5	...	5.0	14.0
Boise, Idaho	20.1	...	6.0	16.0
Twin Falls	21.1	21.1	6.0	16.5
Albu'que, N. M.	14.5	...	6.5	9.5
Roswell	13.5	13.5	6.5	8.0
Santa Fe	15.5	...	6.5	9.5

*Includes city tax of 0.5 cent. †Includes state tax of 1 mill.

Tank wagon represents price to consumers. Dealer represents price to dealers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Cons'r tank car	Dir. tank wag.	Incl. tax	tank wag.
New Orleans, La.	13.75	16.25	8.0	†11.0
Baton Rouge	14.75	17.25	8.0	‡10.5
Alexandria	14.75	17.25	8.0	‡10.5
Lafayette	15.00	17.50	8.0	‡10.0
Lake Charles	14.75	17.25	8.0	‡10.0
Shreveport	13.50	16.00	8.0	†9.0
Knoxville, Tenn.	18.00	19.50	8.0	12.5
Memphis	16.00	17.50	8.0	11.0
Chattanooga	17.50	19.00	8.0	12.0
Nashville	17.00	16.4	8.0	11.5
Bristol	18.25	17.50	8.0	12.0

Essolene at dealer price less 0.5 cent per gallon to undivided dealers.

†Includes 1-cent parish tax and 1-cent state tax. ‡Includes 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gal. or more in one territory take posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gal. at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less 0.5 cent per gallon. Kerosene prices include 1-cent state tax.

Effective February 24, 1939, the company reestablished in New Orleans the commercial consumer policy on motor fuel effective in the rest of the state.

Effective December 12, 1938, the company revised its commercial consumer policy on motor fuel in New Orleans, as follows: Single deliveries of less than 50 gal., consumer tank car plus 2 cents per gallon 50 to 199 gal., consumer tank car plus 1 cent per gallon; 200 gal. and over, consumer tank car plus 0.5 cent per gallon.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline		Kero.
	Tank wag.	Incl. tax.	tank wag.
Texarkana, Ark.	13.0	5.0	7.0
Fort Smith	14.5	5.0	7.5
Little Rock	16.75	7.5	8.0
Muskogee, Okla.	12.0	5.0	7.0
Oklahoma City	10.0	5.0	6.5
Tulsa	11.0	5.0	6.0

Tank wagon represents price to consumers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Dir.	Incl. tax	tank wag.
Omaha	16.5	14.9	6.0	9.0
McCook	17.0	13.9	6.0	9.5
Norfolk	17.0	14.9	6.0	9.9
North Platte	17.3	14.5	6.0	10.2
Scottsbluff	17.9	15.0	6.0	10.5

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective January 1, 1935.

Texas

	Gasoline			Kero.
	Tank wag.	Dir.	Incl. tax	tank wag.
Dallas, Tex.	11.0	15.0	5.0	7.0
Fort Worth	11.0	15.0	5.0	7.0
Houston	13.5	17.5	5.0	8.0
San Antonio	12.0	16.5	5.0	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank wagon*
Oleum spirits	16.2
V.M.&P. naphtha	16.5
Cleaners' naphtha	15.5
Stanisol	15.5

*Prices include 3-cent Illinois tax but not 1-cent federal tax nor 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gal. lots if covered by contract.

Canada*

3-Star Imperial Gasoline

IMPERIAL OIL, LTD.

	Gasoline		Kero.
	Tank wag.	Incl. tax.	tank wag.
Halifax, N. S.	25.0	10.0	19.0
St. John, N. B.	25.0	10.0	19.0
Montreal, Que.	24.0	8.0	16.5
Toronto, Ont.	23.5	8.0	16.0
Hamilton, Ont.	23.5	8.0	16.0
Winnipeg, Man.	26.5	7.0	20.5
Brandon, Man.	28.0	7.0	22.9
Regina, Sask.	25.0	7.0	20.0
Saskatoon, Sask.	28.0	7.0	23.0
Edmonton, Alta.	25.9	7.0	20.0
Calgary, Alta.	23.0	7.0	18.0
Vancouver, B. C.	21.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon prices. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Tank-Wagon Changes

Standard Oil Co. (Kentucky) reduced consumer tank-wagon and net dealer gasoline as follows: May 3, 1.5 cent in Atlanta; May 24, 1 cent in Montgomery; May 29, 0.5 cent in Jacksonville; May 29, 1.5 cents in Miami; June 6, 0.5 cent in Paducah, Mobile, Savannah, and Pensacola; May 27, 0.5 cent in Macon; June 1, 1 cent in Tampa; June 7, advanced consumer tank-wagon and net dealer gasoline 2.5 cents in Macon. June 6, reduced tank-wagon kerosene 0.5 cent in Vicksburg and Jackson; June 11, reduced tank-wagon kerosene 1 cent in Atlanta.

Socony-Vacuum Oil Co., Inc., June 20, reduced consumer tank-car gasoline 0.4 cent in Albany, Portland, Manchester,

(Continued on Page 159)

Prices of Refined Products

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of June 25, 1940

The quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents a gallon on lubricating oils. Octane ratings in Middle West, Mid-Continent, and Southwest are based on A.S.T.M. method of testing.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04⅝	.04⅝
63-66 octane	.04⅛	.04⅛
60 octane and below	.03⅝	.03⅝
60-62 400 grades:		
72-74 octane (regular)	.04⅝	.04⅝
63-66 octane	.04⅛	.04⅛
60 octane and below	.03⅝	.03⅝

NORTH TEXAS—

U. S. Motor grades:		
72-74 octane (regular)	.04⅝	.04⅝
63-66 octane	.04⅛	.04⅛
60 octane and below	.03⅝	.03⅞
60-62 400	.04⅝	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

U. S. Motor grades:		
72-74 octane (regular)	.05⅛	.05⅝
63-66 octane	.04⅝	.04⅞
60 octane and below	.04⅛	.04½

ARKANSAS (Ark. and N. La. del.)—

U. S. Motor grades:		
72-74 octane (regular)		.04¾
60 octane and below		.04

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04¾	.04⅞
63-66 octane	.04⅝	.04½
60 octane and below	.04	.04⅛
60-62 400 grades:		
72-74 octane (regular)	.04¾	.04⅞
63-66 octane	.04⅝	.04½
60 octane and below	.04	.04⅛

PENNSYLVANIA (inland refineries)—

74-76 octane (regular)		.06
72-74 octane		.05¾

CALIFORNIA (domestic movement)—

58-60 400, 65 oct. and higher	.06¼	.07⅛
54-58 U. S. Motor	.05	.06½

EAST COAST (domestic)—

U. S. Motor, 65 and above:	
*New York (Bayonne)	.06
Philadelphia	.06
Boston	.06¼
Baltimore	.06
Charleston, S. C.	.06½

*All grades of gasoline ⅛ to ¼ cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery ¼ cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
72-74 octane	.04½	.04⅝
70-72 octane (leaded)	.04⅛	.04⅛
68-70 octane	.04	.04⅛
65-67 octane	.03⅞	.04

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.01½
Grade 18-55	.01⅝	.01⅞

NORTH TEXAS—

Grade 26-70		.01¼
Grade 18-55		.01½

CALIFORNIA—

75-85 375-390	.05¼	.05¾

NORTH LOUISIANA (Ark. and N. La. delivery)—

Grade 26-70		.01⅝

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110-flash, 540-550 e.p.	.03⅝	.03¾
41-43 gr., 300-320 i.b.p., 110-125 flash, 500-520 e.p.	.03¾	.03⅞
46-48 gr., 210-230 i.b.p., 480-max., e.p.	.03⅞	.04

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

42-44	.03⅞	.04
41-43	.03¾	.03⅞

NORTH TEXAS—

41-43	.03¾	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

41-43	.03⅞	.04

ARKANSAS (Ark. and N. La. del.)—

41-43		.04¼

PENNSYLVANIA (inland refineries)—

47	.05¼	.05⅝
46	.05⅛	.05¼
45	.05	.05⅛

CHICAGO (Based on Group 3)—

42-44	.04	.04⅛
41-43	.03⅞	.04

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.04½	.05½

NEW YORK (Bayonne, N. J.)—

41-43	.05½	.06

GULF COAST (domestic)*—

41-43	.04¼	.04⅝

*Barge price ⅛ cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.03⅝	.03⅝
No. 1 prime white, 38-42	.03⅝	.03½
No. 1 straw, 38-40		.03⅜
No. 2 straw, 32-36	.03¼	.03⅜
No. 3 zero to 10, 28-32	.03⅛	.03¼

NORTH TEXAS—

No. 1 prime white, 38-42	.03⅜	.03½
No. 1 straw, 38-40		.03⅜

NORTH LOUISIANA (Ark. and N. La. delivery)—

No. 2, 32-36	.03	.03⅛

ARKANSAS (Ark. and N. La. del.)—

No. 2, 32-36	.03¼	.03½

CHICAGO (Based on Group 3)—

Range oil	.03⅝	.03¾
No. 1 prime white, 38-40	.03½	.03⅝
No. 2 straw, 32-36	.03¼	.03⅜
No. 3, zero to 15, 28-32	.03⅛	.03¼

NEW YORK (Bayonne, N. J.)—

*No. 1	.055	.060
*No. 2	.047	.053
*No. 4	.047	.050

*Barge deliveries ⅛ to ¼ cent under above tank-car price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil, under 35	.02⅝	.02¾
No. 5, low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH TEXAS—

U.G.I. gas oil, under 35	.02⅝	.02¾
No. 5, low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH LOUISIANA (Ark. and N. La. delivery)—

10-14 fuel oil, industrial	.65	.70

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅝	.02⅞
No. 5, low pour point, 18-22	.75	.80
No. 5, 15 and above, 18-22	.60	.70
No. 6, low pour point, 10-16	.60	.70
No. 6, 15 and above, 10-16	.45	.55

PENNSYLVANIA (inland refineries)—

36-40		.04

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.10	1.25
24 plus diesel, per bbl.	1.10	1.25
24 plus diesel (bunkers)	1.20	1.35
12-16 (bunkers at tidewater)	.65	.75
10-16 (cargo lots)	.65	.75
12-17 (tank cars)	.60	.75
10-17 (high sulfur)	.50	.65
San Joaquin Valley:		
10-18 (tank cars)	.50	.70
24 plus diesel, per bbl.	1.10	1.25
San Francisco:		
24 plus diesel, per bbl.	1.35	1.40
24 plus diesel (bunkers)	1.40	1.50
10-16 (bunkers)	.80	.85

GULF COAST—

No. 2 fuel	.03¼	.03½
43-47 diesel	.03½	.03¾
48-52 diesel	.03¾	.04
53-57 diesel		.04
58-and-above diesel	.04	.04¼
Diesel bunkers		1.50
Bunker C (bulk cargoes)		.80
Bunker C (bunkers)		.80

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil	.04½	.05
28-30 diesel (lighterage 6¼c per bbl.)		1.95
28-30 diesel (tank cars)	.04½	.05
Bunker C (to ocean-going ships in N. Y. Harbor)		1.35
Industrial fuel (tank cars)	.033	.035

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		.20
150-160 D, 0-10		.16
150-160 D, 10-25		.15½
100-110 D, 0-10		.15
100-110 D, 10-25		.14½
Steam refined:		
600 dark green (untreated)		.07

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		.20½
15 pour point		.19½
25 pour point	.17	.18
Steam refined:		
600		.11
650		.13
600 flash		.14
630 flash		.16

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
150-3	.08½
180-3	.09½
200-3	.10
250-3	.11
280-3	.11½
280-4	.11
300-3½	.12
350-3½	.12½
400-3½	.13
500-3½	.14
600-3½	.15
100-2½ paraffin oil, 10-25	.05¼
10-25 pour point:	
200-3	.09½
250-3	.10½
280-3	.11
280-4	.10½

GULF COAST—

Pale oils:		
100-3	.05½	.05⅝
200-3	.07⅛	.07½
300-3	.07⅝	.08
500-3½	.08½	.09
750-3½	.09	.09½
1,200-3½	.09⅝	.10
2,000-4	.10	.10¼
3,000-4	.12¼	.12½
Red oils:		
200-5-6	.07	.07¼
300-5-6	.07½	.07⅝
500-5-6	.08¼	.08⅝
750	.08⅝	.09¼
1,200-5-6	.09⅝	.09⅝

CALIFORNIA (Moving to dom. market)—

Pale oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11¼
400-5-6	.09¼	.11¼
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11⅝

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		.23
10 pour point		.22
15 pour point		.21
25 pour point	.19	.20
200 vis. at 70° F., 3 color:		
Zero pour point		.25
10 pour point		.24
15 pour point		.23
25 pour point	.21	.22

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	.04⅝	.04½

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	.03⅝	.04
124-126 (A.m.p.) w.c. scale	.03⅝	.04

NEW YORK—

Wax in bags fully refined:		
125-127 (A.m.p.) wax		.0630
128-130 (A.m.p.) wax		.0640
130-132 (A.m.p.) wax		.0660
133-135 (A.m.p.) wax		.0685
135-137 (A.m.p.) wax		.0725
Crude scale:		
124-126 (A.m.p.) w.s.	.04⅝	.04½
124-126 (A.m.p.) y.s.	.04⅝	.04⅞
Petrolatum in barrels, carload lots:		
Dark green	.02625	.03125
Amber	.02875	.03375
Extra amber	.03000	.03625
Lily white	.05125	.05875
Snow white	.06125	.06875
Cream	.04125	.04875

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.04	.04⅛
60-62 400	.04⅛	.04⅜
61-63 390	.04⅛	.04⅜
64-66 375	.04	.04⅜

LOS ANGELES—

U. S. Motor grades:		
Above 69 octane	.06¼	.06½
65-69 octane	.05⅝	.06⅛
60-65 octane	.05¼	.05⅝

KEROSENE

GULF COAST—

41-43 water white	.04⅛	.04⅝

LOS ANGELES—

41-43 water white	.05	.05⅛

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.o.s. in bbl.)—

Cylinder stocks:		
600 S.R. unfiltered	.18½	.19½
630 S.R. unfiltered	.19½	.21½
600 flash, S.R.	.20	.22½
630 flash, S.R.	.24½	.25½
Bright stock:		
Light, 25 pour point	.25	.28

NEUTRAL OIL

200-3 color	.27	.28
150-3 color	.26	.29

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 A.m.p.		.06⅝
125-127 A.m.p.		.06¾
128-130 A.m.p.		.07
133-135 A.m.p.		.07¾
135-137 A.m.p.		.08¼
Crude scale:		
124-126 w.s.	.04⅜	.04⅝
124-126 y.s.	.04⅜	.04⅝

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CRANE CO., oil possibilities, cheap fee land, 3 mi. E Ward Gulf-Western drilling. J. G. Smith, 215 Littlefield Building, Austin, Texas.

INVESTOR with $1,000 join me on 50-50 basis drilling 320 A. proven gas lease. Gas Cont'd 6c 1,000 ft. Total cost $2,000. Big profits. 3D-710 S. Elgin, Tulsa, Okla.

SPECIALIZED Geophysical investigations conducted for petroleum promise. In touch with many opportunities to and for development of drilling blocks. P. O. Box 364, Fort Worth, Texas.

IMMEDIATE DRILLING WANTED on 160-acre semiproven oil lease in Loving County, $10.00 per acre. Can cooperate liberally in equipment and drilling expenses. E. L. Stratton, Pecos, Texas.

LEASES in Clinton sand gas field, Ohio. Depth 2,700, price gas 18c. Berea oil sand 700. Production in both on adjoining farms. A splendid opportunity. L. W. Fierbaugh, 411 Diamond St., Ashland, Ohio.

TEN year leases covering four structures, Ky-Tenn shallow field; 10 cent rentals, no drilling obligations, very shallow production, no proration, good roads. N. M. Sauls, Geologist, Cookeville, Tenn.

Leases and Drilling Blocks

FOR SALE Oil and gas leases and small production located in Kentucky shallow field, and leases located in Clay County, Tenn. Have for sale two tracts of proven Fluorspar and Zinc deposits; reports furnished on request. W. P. Harley, Bowling Green, Kentucky.

NEW MEXICO
STATE OIL AND GAS LEASES
40 acres and multiples thereof. In the Hot Spots. Buy direct. Save those dollars. No middle man to pay; no salesman to bother you! Twenty years in the business without a complaint. Write for information.
HARRY S. WRIGHT
New Mexico State Lessee
Wright Bldg., Farmington, New Mexico

WEST TEXAS OIL LEASES
AND ROYALTIES
If you wish to buy or sell producing or non-producing oil leases or royalties located in West Texas or Eastern New Mexico, Address:
AMERICAN NATIONAL BROKERAGE CO.
Post Office Box 516
Levelland, Texas.

BUYING, SELLING and HANDLING oil production, proven, semi-proven, wildcat royalties and leases, drilling blocks, lands and large loans to owners of these properties. Inspecting and estimating values is and has been my business at this place thirty years. See or write me at Box 13, Alanreed, Gray Co., Texas. E. B. Reeves.

HAVE rig ready to start deep test well in Eastern Kansas; good acreage; good proposition; will bear rigid investigation; need financial aid for expenses. C. W. Fleming, Muncie, Kansas.

FOR complete and accurate coverage of the new Artesia Area, read The ARTESIA (New Mexico) ENTERPRISE. $2 a year.

5 YR. oil loans. $50,000 to $5,000,000. On production, oil payments, royalties, real estate. Low interest. Inquiries invited. L. A. (Pat) Casey, Esperson Bg., Houston; Nat. Bk. Com. Bg., San Antonio; Dan Waggoner Bg., Ft. Worth.

EAST TEXAS Paluxy-Trinity sand wildcats now drilling others starting shortly afford you chances for quick money. Leases close in. E. CROFT, Proctor, Tex.

IMMEDIATE delivery, large or small tracts on Lincoln Fold, North Missouri. Ten year, 25-cent rental, all close around five wells now drilling. Price depending on location. J. W. Eddington, Kirksville, Mo.

KENTUCKY OPPORTUNITY
4000 Acres of very desirable gas and oil leases offered. Will consider drilling deal.
JOHN PAUL GIBSON
35 South William St., New York City.

Leases and Drilling Blocks

WANTED: Reliable partner to carry half interest 240 acre lease, Kentucky field. 650 to 700 ft. Several wells in area; oil and gas. Others drilling; locations staked for more. Ready market for gas; grand opportunity for 42-gravity oil. Address 907 S.E. Third St., Evansville, Ind.

CASH paid for producing wells. Or will immediately drill proven land. Describe fully or no reply. P.O. Box 93, Tulsa, Ok.

NE¼ of SE¼ of section 24-10-3, in Jefferson Davis Parish, La., now open for lease. Chas. L. Doan, Welsh, La.

WILL SELL 35 acres oil lease in Sec. 14, Claremont, Twnshp., Richland County, Ill. Chosen drilling site. G. Hedelin, Grand Rapids, Mich.

ROCK asphalt mine prospect, Uvalde County; will sell or lease, favorable terms. Lewis Smyth, Uvalde, Texas.

EAST Texas oil leases. $500 acre. Near test and large Co. holdings. L. Lahm, 2931 Missouri Ave., St. Louis, Missouri.

Survey Service

REMEMBER EAST TEXAS
When all other methods fail, employ my divining or dowsing method. If oil exists this method finds it. Faults, broken treacherous areas accurately defined. Our Watson #2, first producer Wilmington, Calif. field, located by this method. More reliable than mechanical geophysics. Ask any unbiased oil authority. Many years' experience. A wise man investigates. George Miller, 1548 Post, Torrance, California.

Help Wanted

PIPING DRAFTSMAN for oil refinery work, capable of making good drawings and having sufficient experience to qualify as checkers. State full experience record, age and salary. Arthur G. McKee & Co., 2422 Euclid Avenue, Cleveland, Ohio.

RESPONSIBLE ● ● INDIVIDUALS
$1,800 to $25,000
Use this thoroughly trained organization to locate and NEGOTIATE the kind of position you want. If you have earned $1,800 or more, write for details.
EXECUTIVE SERVICE, Inc.
State Life Bldg. Indianapolis, Ind.

MANUFACTURER'S SALES REPRESENTATIVE, acquainted with drilling operations along Gulf Coast, wanted to sell boiler steam equipment. Must have general knowledge of drilling and previous oil well supply field experience. Address Box K-674. The Oil and Gas Journal, Tulsa, Oklahoma.

CLASSIFIED ADVERTISING RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	$1.05	$1.80	$2.55	$3.30	7 Lines	$2.45	$4.20	$5.95	$7.70
4 Lines	1.40	2.40	3.40	4.40	8 Lines	2.80	4.80	6.80	8.80
5 Lines	1.75	3.00	4.25	5.50	9 Lines	3.15	5.40	7.65	9.90
6 Lines	2.10	3.60	5.10	6.60	10 Lines	3.50	6.00	8.50	11.00

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Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	1 time	$5.00
1 Inch	13 times	4.50 per inch
1 Inch	26 times	4.00 per inch
1 Inch	52 times	3.50 per inch

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

Brokers—Salesmen

Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Security and Exchange Commission. Inquiries invited.

B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

PURCHASERS AND DISTRIBUTORS
PRODUCING ROYALTIES
Registered with S. E. C.
INVESTMENT ROYALTIES, LTD.
Ramsey Tower, Oklahoma City, Okla.

Situations Wanted

PRODUCTION AND DRILLING SUPERINTENDENT with several years' major company experience would like to join independent company, drilling contractor or individual. Can take full charge of your operations. Address Box K-642, The Oil and Gas Journal, Tulsa, Okla.

MECHANICAL Engineer 5 years oil field experience. Desires position that will involve production or training for sales engineering. Available now. Address Box K-640, The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG Refinery Tech. now employed by major oil Co. desires change. Several yrs. experience in management of absorption, polymerization, treating, and stabilization plants. Also lab and pilot plant work. College grad. with post-grad. work in Petrol. Refining. Box K-676, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY EXECUTIVE thoroughly trained and experienced in design construction and operation of refineries and the manufacture of all products. Efficient, energetic, diplomatic. Desires permanent connection or design construction and operation on partnership basis. Now employed. Box K-675, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED chemical engineer now employed desires position with progressive firm. B.S. degree in engineering. 12 years practical experience processing, management and refining operations. Qualified refinery engineer and Supt. Can furnish references. Address Box K-672, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT, 17 years' experience drilling, production, refining, taxation, desires new connection with progressive firm. Address Box K-641, The Oil and Gas Journal, Tulsa, Okla.

YOUNG MAN, Graduate Engineer, married, free to travel. Two years' production experience with major Co. and two years in Oilfield construction. Box K-671, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer: Young production engineer experienced in Mid-Continent desires position as engineer with reliable company or independent. Now employed but desires change. References. Box 670, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL engineer, 9 years in mechanical design desires connection of permanent nature. Box K-678, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Star #28 beam steam machine lines and tools complete. Box 592, Emporia, Kansas.

TRACTORS

Caterpillars, crawler type, size "35," $375; size "65" with nigger-head winch $750; Caterpillar RD8 with bulldozer $2000; Allis-Chalmers Model L with bulldozer $1750. Guaranteed, slightly used. O. C. Evans, Mt. Sterling, Ky.

FOR SALE

10,000 Ft. 2½" seamless tubing, used in flowing wells only.

10,000 Ft. 7" O.D. 26# seamless casing, once run.

15,000 Ft. 4½" O.D. seamless drill pipe equipped with both regular and full hole tool joints.

In addition to the above we have 20,000 Ft. screw line pipe in Oklahoma; also drilling rig capable of drilling to 6500 feet, complete stock of line pipe, casing, drilling and pumping equipment.

Wire, Write or Phone for Prices.

Louisiana Iron & Supply Co.
Shreveport, La.

FOR SALE CHEAP: Complete rotary drilling rig. Steam powered, completely unitized. Big Spring Iron & Metal Co., Big Spring, Texas.

ONE 84-FT. IDECO angle-iron derrick. One Lamtex casing pump. Carl T. Matthews, Hominy, Okla.

916 C.F.M. Ingersoll Rand XRB 14" x 14" x 14" Tandem Duplex Compressor 50# Pressure with 100 HP GE 2200 Volt Motor Oil Switch and Starter Completely Assembled on Structural Steel Frame. Absolutely first-class condition and in operation. $1500.00 FOB Houston. Banks Moreland Company, W-61763, P.O. Box 1764, Houston.

STORAGE tanks, pumps, compressors, Griscom-Russell bentube sections, condensers, stills, portable steel buildings, pipe and fittings direct from gasoline plants now being dismantled. Box K-677, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—1,000 barrel capacity oil refinery, located at Neosho Falls, Kans., well equipped. J. H. Wilie, Piqua, Kans.

FOR SALE: 8,000 ft. 4" standard pipe plain end, 30-ft. lengths, the pile 15 cents. M. J. Regan, Coffeyville, Kans.

FOR SALE—Refinery in Central Kansas. Well established, doing good business as books will show. Entering other business. Box 222, Chase, Kansas.

Pressure Vessels—Priced for Immediate Sale

3—4' x 41' 2½" x 4½" thickness, One Piece Hammer Welded Vessels
Tulsa, Oklahoma and Oil City, Pa.

1—6' x 40' x 2½" thickness, Riveted and Welded Vessel

20—4' x 20' x 7/16" thickness, One Piece Fusion Welded Vessels

WIRE PHONE WRITE

SONKEN-GALAMBA SUPPLY CORPORATION

W. C. Berry and H. J. Galamba
Riverview at Second, Kansas City, Kansas

Robt. W. Duden
2100 S. Union, Tulsa, Oklahoma

FOR SALE: 7 ft. x 20 ft. Butane welded storage tanks 125# WP, capacity 6000 gallons. I.T.I.O. Co., Bartlesville, Okla.

SELLING out stock pipe connections, valves, tools, 18" pipe-threading machine and motor. A. D. Elliott, Depew, Okla.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio

LONGYEAR Rotocore truck mounted with 45-foot derrick attached, 7¼ x 10 Gardner Denver V-Belt driven powered pump all roller bearings. Complete with slips, blocks, kelly lines and tools ready to drill with or without drill stem. Address Chamber of Commerce, Electra, Tex.

THREE THOUSAND BARREL REFINERY for sale, over sixty thousand barrels storage, about six miles four inch pipeline. Write TOWER REFINING CO., 612 Santa Fe Bldg., Dallas.

FOR SALE: At Oklahoma City, 1 Muskogee Model "B" skid type well service machine with PA-100 International Motor. I. T. I. O. Company, Bartlesville, Okla.

ALMOST-NEW Power-Equipped Guffey "45" Portable Draw Works. 150 H.P. WOKU Waukesha Engine. Received as trade-in on larger unit. Used on 11 wells. Thoroughly checked, gone over. New guarantee. On display our Okla. City plant. Offered at a big saving! JONES, SHELBURNE & GUFFEY, Inc., Petroleum Bldg., Okla. City, Oklahoma. Phone 2-4153.

Equipment Wanted

WANTED: Flash chamber, six feet six inches or seven feet ID or OD diameter, by 35 to 40 feet length, minimum thickness one and one quarter inches. If two 18 to 20 ft. vessels obtainable of same diameter and thickness, will consider. Box K-673, The Oil and Gas Journal, Tulsa, Oklahoma.

Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog, samples on request. Burkhart Ptg. & Sta. Co. 115 S. Cinn. Tulsa, Oklahoma.

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

Geophysical Service

HOMER L. FITCH, GEOPHYSICIST AND LOCATION ENGINEER
WHY drill dry holes? Our method only locates structures which contain oil or gas. Locations made by us will produce or no pay. Drawer 711, Brownsville, Texas.

For Sale—Maps

R. B. ROBINSON MAPS
Jackson, Miss. 3-Hart Bldg., Across Street from Heidelberg Hotel. Ownership maps All Over Mississippi.

1940 OIL AND GAS FIELD MAP
Texas, Eastern New M. Price $1.00.
Wildcat Map $3.00 Published monthly.
ZINGERY OIL MAP CO., Fort Worth, Tex.

Mailing Lists

ROYALTY Owners, Oil Investors, Unit Holders, Stockholders in Oil, Royalty and Mining Companies. Personnel lists of every branch of oil industry. All by states. We buy or swap lists. Oil Industry Mailing List Co., Tulsa Loan Bldg., Tulsa, Okla.

Incorporations

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

CAPITAL SEEKERS
Put your project before 260 Key-Men. Cost trifling. Details free. AMSTER LEONARD, Fox Theater Building, Detroit, Michigan.

Manufacturing Machinist

MACHINE SHOP
Specializing in
Research, Laboratory and Subsurface Equipment, desires manufacturing connection, preferably oil field specialties.
JACK ANTHONY MACHINE WORKS
1538-40 E. 11th St., Tulsa, Okla.

Investment Wanted

MANUFACTURER or Sales organization to distribute exclusively, a new, radically different, drill bit proved 25% to 65% more efficient than the fish tail, in all formations and depths. Liberal terms. Kless, 414 Stratford St., Houston, Texas.

Financing

JOHN MORRIS, Box 5411, Philadelphia, studied records 5000 financial houses. Found only 191 buy new issues. $4.00.

Gulf Coast Markets

(Continued from Page 155)

3¼ to 3½ cents, and have material, but buyers were reported trying to shade those prices. Failure of buyers to make connections indicated sellers were not inclined to make concessions.

Easing of gasoline quotations was of no particular significance. The quotations at any figure still are more or less nominal in view of lack of spot-market sales. It also has been assumed for some time that sellers were willing to shade quotations on firm orders. Contract material continues to move out in fairly good volume but the market still lacks supporting new business to establish any firmness in prices.

Reduction in tanker rates to the Atlantic seaboard the past week normally should be expected to result in firming of prices, but the quick reductions in eastern markets following the tanker cuts forestalled the chances of coastal supplies from absorbing these cuts.

With France and Italy now removed as possible foreign outlets, export shipments from the Gulf Coast dropped the past week to practically nothing. As far as gasoline markets are concerned, however, this loss of export business has already been discounted and is not expected to result in any further lowering of gasoline prices.

Bunkering terminals along the Gulf Coast report that the only foreign boats now being fueled are a few British ships, mostly general freighters. Ships of other flags were conspicuous by their absence the past week.

Except for Bunker C fuel for coastwise movement, few spot sales of any product were reported during the week. However, except for gasolines there did not seem to be an excess quantity of material in storage. Kerosenes were softer but material was available only from limited sources. Lubricating oils were easy but so far no great amount of distress material is evident. Most sellers report contract movements still holding up.

Tank-Wagon Changes

(Continued from Page 156)

Hartford, and New Haven; 0.2 cent in Burlington, Boston, and Worcester; 0.3 in Providence; reduced dealer tank-wagon gasoline 0.6 cent in Albany; 0.3 cent in Staten Island; 0.2 cent in Portland and Boston; 0.4 cent in Burlington and New Haven; 0.05 cent in Providence.

Standard Oil Co. (Indiana) June 15 reduced dealer gasoline 1 cent in Minneapolis; June 20, reduced tank-wagon kerosene 1.4 cent.

Continental Oil Co. reduced tank-wagon and dealer gasoline as follows: April 22, 2 cents in Santa Fe; June 14, 2½ cents in Roswell; June 12, 1 cent in Butte; June 18, reduced tank-wagon kerosene 0.5 cent in Albuquerque and Santa Fe.

Rocky Mountain Runs

Production estimates for week ended June 22:

WYOMING

	Bbl.
Salt Creek	14,070
Big Muddy	1,170
Byron	1,590
Cole Creek	380
Dallas Derby	410
Frannie	2,850
Garland	3,350
Hamilton Dome	2,690
LaBarge	1,400
Lance Creek	25,620
Lost Soldier	1,870
Medicine Bow	730
Oregon Basin	7,190
Osage	600
Quealy Dome	470
Rock River	2,520
Wertz	1,930
Miscellaneous	1,820
Total Wyoming	70,650

MONTANA

Kevin-Sunburst	5,250
Border	120
Cat Creek	480
Cut Bank	10,590
Dry Creek	710
Pondera	690
Total Montana	17,830

NEW MEXICO

Arrowhead	3,040
Cooper	3,150
Eaves	650
West Eunice	240
Eunice	17,950
Halfway	160
Hardy	3,020
Hobbs	9,980
Jal	370
Langlie	4,460
Lynch	410
Lynn	850
Mattix	4,930
Monument	19,030
North Lynch	40
Penrose	4,610
Rhoades	130
Skaggs	80
Skelly	1,700
South Eunice	2,360
South Lovington	1,360
Vacuum	12,010
Artesia-Maljamar	16,040
Aztec-Bloomfield	10
Getty	100
Hogback	200
Rattlesnake	350
Table Mesa	90
Total New Mexico	107,320
Total Colorado	3,870
Total Rocky Mountain region	199,670

Index to Advertisers

A

Abercrombie Pump Co. 144
AC Spark Plug Division of General Motors Corporation .....
Acme Fishing Tool Co. 90
Ainsworth Bros., Inc. 91
Air Reduction Sales Co. 1
Ajax Iron Works .....
Alco Products Division of American Locomotive Company .....
Allis-Chalmers Mfg. Co. .....
Allison, R. J. .....
American Blower Corporation ....
American Bosch Corporation .....
American Cable Division of American Chain & Cable Co., Inc. .....
American Cast Iron Pipe Company
American Hoist & Derrick Co. ... 84
American Iron & Machine Works
American Locomotive Company, Diesel Engine Division .....
American Meter Company .....
American Roller Bearing Co. 21
American Rolling Mill Co., The .. 94
American Steel & Wire Company .
Armstrong Bros. Tool Co. .....
Armstrong Machine Works .. 106-134
Athey Truss Wheel Co. .....
Atlas Supply Co. .....
Auer, C. L. and W. W. .....
Austin-Western Road Machinery ..
Axelson Manufacturing Company

B

Baash-Ross Tool Company 76
Babcock & Wilcox Tube Company, The .....
Badger & Sons Co., E. B. .....
Baker Oil Tools, Inc. 26
Baldwin-Duckworth Division of Chain Belt Company .....
Bantam Bearings Corp. .....
Baroid Sales Division, National Lead Co. 22
Barret, William M., Inc. 144
Bethlehem Supply Company .....
Bethlehem Steel Co. .....
Braden Steel Corporation .....
Bradford Motor Works, Inc. 141
Brance-Krachy Co., Inc. .....
Brauer Machine & Supply Company .....
Brewster Company, The 115-135
Bridgeport Machine Company, The
Bristol Company, The .....
Broderick & Bascom Rope Co. .....
Brown Instrument Company, The
Bruning, Charles, Co., Inc. .....
Buckeye Traction Ditcher Co. ....
Bucyrus-Erie Company 17
Burgess Battery Co. .....
Butler Manufacturing Co. .....
Byron Jackson Co. .....

C

Cable, Jo H. .....
Cameron Iron Works, Inc. .....
Cardwell Mfg. Co., Inc. 2
Carey Company, The Philip .....
Carnegie-Illinois Steel Corporation
Cast Iron Pipe Research Association, The 66
Caterpillar Tractor Co. .....
Cavins Company 134
Century Electric Company 23
Chain Belt Company .....
Chaplin-Fulton Mfg. Co., The .....
Chapman Valve Mfg. Co., The .....
Chemical Process Co., Inc., The 112
Chevrolet Motor Division, General Motors Sales Corporation
Chicago Bridge & Iron Company Inside Front Cover
Chiksan Tool Co. 135
Clark Brothers Company .....
Classified Advertising 158-159
Cleveland Trencher Company ... 140
Climax Molybdenum Company ....
Columbia Steel Company .....
Columbian Steel Tank Co. .....
Continental National Bank of Fort Worth .....
Continental Oil Co. .....
Continental Motors Corp. .....
Continental Supply Company, The 97
Cooper, Fred E. .....
Cooper-Bessemer Corp., The .....
Core Laboratories, Inc. .....
Crane Co. 7
Curtin, W. H., & Co., The .....

D

Darling Valve & Mfg. Co. .....
Davis Regulator Co. 119
Dayton Rubber Mfg. Co., The .....
Dearborn Chemical Co. .....
Depthograph Company 114
Diamond Chain & Mfg. Co. .....
Diesel Power & Machinery Co. .....
Dodge Division, Chrysler Corporation .....
Donovan Boiler Works .....
Dowell Incorporated .....
Dragon Mfg. Co., The 120
Dresser Mfg. Co., The .....
Drilling Equipment Directory ... 149
Duff-Norton Manufacturing Co., The 142
Du Pont de Nemours & Co., Inc.

E

Eagle-Picher Lead Co. .....
Eastman Oil Well Survey Co. ....
Economy Electric Lantern Co. ....
Elastic Stop Nut Corp. .....
Emsco Asbestos Company 134
Emsco Derrick & Equipment Company .....
Enardo Foundry & Mfg. Co. .....
Engineering Laboratories, Inc. ... 121
Ensign Carburetor Company, Ltd.
Ethyl Gasoline Corporation .....

F

First National Bank of Fort Worth
First National Bank in Houston ..
First National Bank & Trust Co. of Tulsa, The 110
Fisher Governor Company 20
Fluid Packed Pump Co. 111
Fluor Corporation, Ltd., The ....
Ford Motor Co. .....
Fort Worth Chamber of Commerce
Fort Worth Clearing House Association .....
Fort Worth National Bank, The .
Foster Wheeler Corp. .....
Four Wheel Drive Auto Company
Foxboro Co., The .....
Franks Mfg. Corp. 19
Frick-Reid Supply Corporation ...

G

Gardner-Denver Company 8
Garlock Packing Company, The ..
Gaso Pump & Burner Mfg. Co. ...
Gasoline Products Co., The .....
Gates Rubber Co., The .....
Gatke Corporation .....
General American Transportation Corporation—Terminal Division 101
General Electric Company 16
General Machine & Tool Co. 150
General Paint Corporation .....
General Power, Inc. .....
Geological Scientific Service Company, Inc. .....
Geophysical Service, Inc. .....
Gilmer Company, L. H. .....
Girdler Corporation, The .....
Globe Oil & Refining Co. 129
Goodall Rubber Co. .....
Goodyear Tire & Rubber Co. .....
Gott, H. P., Mfg. Co. 112
Graver Tank & Mfg. Co., Inc. ....
Gray Processes Corporation, The
Great Lakes Steel Corporation ....
Green Head Bit & Supply Co. ....
Greenspon's Son Corp., Jos. .....
Gulberson Corporation .....
Gulf Oil Corp. .....
Gulf States Utilities Co. .....

H

Halliburton Oil Well Cementing Co. .....
Hanlon-Buchanan, Inc. .....
Harnischfeger Corporation .....
Harrisburg Steel Corporation ....
Hazard Wire Rope Division of American Chain & Cable Co., Inc. ..... Inside Back Cover
Hewitt Rubber Corp. .....
Hill-Hubbell & Co. 129
Hoard Exploration Co. .....
Houston Pipe Appliance Co. .....
Houston Pipe Line Co. .....
Hughes Tool Co. ..... Back Cover
Humble Oil & Refining Co. .....
Hydril Co. ..... Front Cover

I

Independent Exploration Company 126
Inferno Co., The .....
Ingersoll-Rand Co. .....
International Geophysics, Inc. ....
International Harvester Co. 68
International Nickel Company, Inc. The 24

J

Jadson Motor Products Company
Jarecki Manufacturing Company ..
Jeffrey Manufacturing Company ..
Jensen Brothers Manufacturing Co. 143
Jerguson Gage & Valve Co. 117
Johns-Manville Corporation .....
Johnson, T. C. 141
Jones Company, The S. M. .....
Jones & Laughlin Steel Corporation .....

K

Kansas Gas & Electric Co. 72
Kellogg, M. W., Company, The 6
Kennedy Valve Mfg. Co., The .....
Kerotest Manufacturing Company
Keuffel & Esser Co. .....
Key Company .....
Knupp & Sons, Inc., H. W. 101
Kobe, Incorporated .....

L

Laminated Shim Company, Inc. ..135
Landis Machine Company, Inc. ... 3
Lane-Wells Co., The 9
Larkin Packer Company, Inc. .....
Layne and Bowler Co., The .....
Layne & Bowler, Inc. .....
Leeds & Northrup Co. .....
Le Roi Company 89
Lennox Hotel .....
Leschen, A., Sons Rope Co. .....
Lincoln Electric Company, The ...
Line Scale Co., Inc. 117
Link-Belt Company .....
Lockheed Aircraft Corporation ...
Lone Star Cement Corporation .. 13
Lucey Export Corporation .....
Ludlow Valve Mfg. Co., The .....
Lufkin Foundry & Machine Co. ...
Lufkin Rule Co. 84
Lummus Co., The .....
Lunkenheimer Co., The .....

Mc

McEvoy Company .....
McGregor Working Barrel Company 147
McKissick Products Corp. .....

M

MacClatchie Manufacturing Company 134
Macwhyte Co. .....
Magnolia Airco Gas Products Co. .. 1
Maloney Tank Mfg. Co. .....
Manhattan Rubber Mfg. Division
Manning, Maxwell and Moore, Inc. 105
Marley Company, The .....
Marmon-Herrington Co., Inc. .....
Marsh, James P., Corp. .....
Martin, John N., Mfgr. .....
Martin-Decker Corp. .....
Mayfair Hotel .....
Medart Company 116
Meehanite Research Institute .....
Merco Centrifugal Co. .....
Mercoid Corporation .....
Merco Nordstrom Valve Co. .....
Metric Metal Works .....
Mid-Continent Engineering Co., Inc. .....
Mid-Continent Supply Company ...
Midwest Piping & Supply Company, Inc., The 88
Miller Sand Pump Co. .....
Mission Mfg. Co., The 103
Monsanto Chemical Company .....
Morgan Acid, Inc. 96
Morse Chain Company .....
Mountain Iron & Supply Co. 89
Murray Rubber Company .....

N

National Bank of Tulsa 75
National Carbon Co., Inc. .....
National Steel Corporation .....
National Supply Co., The 108-109
National Transit Pump & Machine Co. .....
National Tube Co. 92-93
Naylor Pipe Company .....
New Bedford Cordage Co. .....
New Deal Specialty Co., The .....
Newman, Hender & Co., Ltd. .....
Norton Company 87
Novo Engine Co. .....
Nugent, Wm., & Co., Inc. .....

O

O.C.S. Mfg. Co., The .....
Ohio Injector Co., The .....
Oil Center Tool Co. .....
Oil Well Supply Company 99
Oliver United Filters, Inc. .....
Osage Metal Company .....
Otis Pressure Control, Inc. .....

P

Page Fence Association .....
Page Steel & Wire Division of American Chain & Cable Co. ..
Parkersburg Rig & Reel Co. .....
Parkhill-Wade 71
Patterson-Ballagh Corporation ... 143
Pease, C. F., Company, The .....
Peerless Pump Division of Food Machinery Corp. .....
Penberthy Injector Co. 61
Pennsylvania Grade Crude Oil Association .....
Perco, Inc. .....
Petroleum Advisers, Inc. 10
Petroleum Electric Power Association 100
Petroleum Rectifying Company
Phelps Dodge Refining Corporation .....
Pittsburgh-Des Moines Steel Company .....
Pittsburgh Equitable Meter Co. ...
Pittsburgh Steel Company .....
Plymouth Cordage Co. .....
Powell, Wm., Co., The .....
Price Co., H. C. .....
Pritchard, J. F., & Co. .....
Pure Oil Co. .....

R

Reading-Pratt & Cady Division of American Chain & Cable Co. ....
Rector Well Equipment Co., Inc.
Reda Pump Co. 80-81
Reed Roller Bit Company .....
Regan Forge & Engineering Co. .. 15
Reilly Tar & Chemical Corporation 120
Republic Rubber Division of Lee Rubber & Tire Corp. .....
Republic Steel Corporation 4
Rockford Drilling Machine Division of Borg-Warner Company 117
Roebling's Sons Company, John A. 18
Ryerson & Son, Inc., Joseph T. ....

S

Schlumberger Well Surveying Corporation .....
Security Engineering Co. .....
Seismic Explorations, Inc. .....
Seismograph Service Corp. .....
Shafer Bearing Corporation 118
Shand & Jurs Co. .....
Shell Oil Company, Incorporated
Sinclair Refining Company (Inc.) 95
Skinner Co., M. B. .....
Smith, A. O., Corporation .....
Smith Company, E. M. .....
Smith Company, Howard .....
Smith, H. C., Tool Co. 135
Smooth-On Mfg. Co., Inc. .....
Socony-Vacuum Oil Co., Inc. .....
South Chester Tube Co. .....
Southwestern Gas & Electric Company .....
Spang Chalfant, Inc. .....
Spang & Company 11
Sperry-Sun Well Surveying Co. ...
Spicer Mfg. Corp. .....
Stando Brake Lining Co. 134
Stanley Belting Corporation .....
Star Drilling Machine Co., The .. 104
Stearns-Roger Manufacturing Co. 71
Steel Founders' Society .....

T

Taylor Forge & Pipe Works .....
Taylor Instrument Companies ....
Technical Oil Tool Corporation, Ltd. .....
Texaco Development Corporation
Thermoid Company 5
Thompson Tool Co., Inc. 105
Thornhill-Craver Co., Inc. .....
Timken-Detroit Axle Co. .....
Timken Roller Bearing Company
Timken Roller Bearing Company, Steel and Tube Division 12
Tobin, Edgar, Aerial Surveys ....
Toledo Pipe Threading Machine Co., The .....
Trackson Company .....
Tretolite Company .....
Trinity Portland Cement Company
Truman-Smith Construction Co. .. 91
Tubbs Cordage Co. .....
Tube-Turns, Inc. .....
Tulsa Boiler & Machinery Co. ....
Tulsa Chamber of Commerce 85
Twin Disc Clutch Co. .....

U

Union National Bank of Wichita .. 82
Union Wire Rope Corporation ....
Unit Rig & Equipment Company ..
United Geophysical Co. .....
United States Rubber Company ..
United States Steel Corp., Subsidiaries 92-93-99
United States Steel Export Company 92-93
Universal Atlas Cement Co. .....
Universal Exploration Co. 82
Universal Oil Products Co. 62

V

Vickers, Inc. .....
Victor Products Corp. .....
Viking Pump Co. 119
Visco Products Company .....
Vogt, Henry, Machine Co. 14

W

Walker, W. L., & Co. 150
Wall-Colmonoy Corp. .....
Wall Rope Works, Inc. 134
Walworth Co. .....
Warren Petroleum Corporation ..
Watson-Stillman Co., The .....
Waukesha Motor Co. .....
Wedge Protectors, Inc. 121
Well Equipment Manufacturing Corp. .....
Well Surveys, Inc. .....
Western Geophysical Company ...
Western Tank & Road Supply Co. 94
Westinghouse Electric & Mfg. Co.
Wheeling Machine Products Company .....
Whitney Chain & Mfg. Co., The ...
Wickwire Spencer Steel Company 65
Wilson Manufacturing Co., Inc. ..
Winfield Chamber of Commerce .. 91
Wisconsin Motor Corporation ....
Witte Engine Works .....
W-K-M Company, Inc. .....
Worthington Pump & Machinery Corporation 83
Wyatt Metal & Boiler Works ....

Y

Youngstown Sheet & Tube Co. ....

The Oil Man's Calendar appears on Page 46

the OIL AND GAS JOURNAL

(41.)

JUN 28 1940

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HYDRIL

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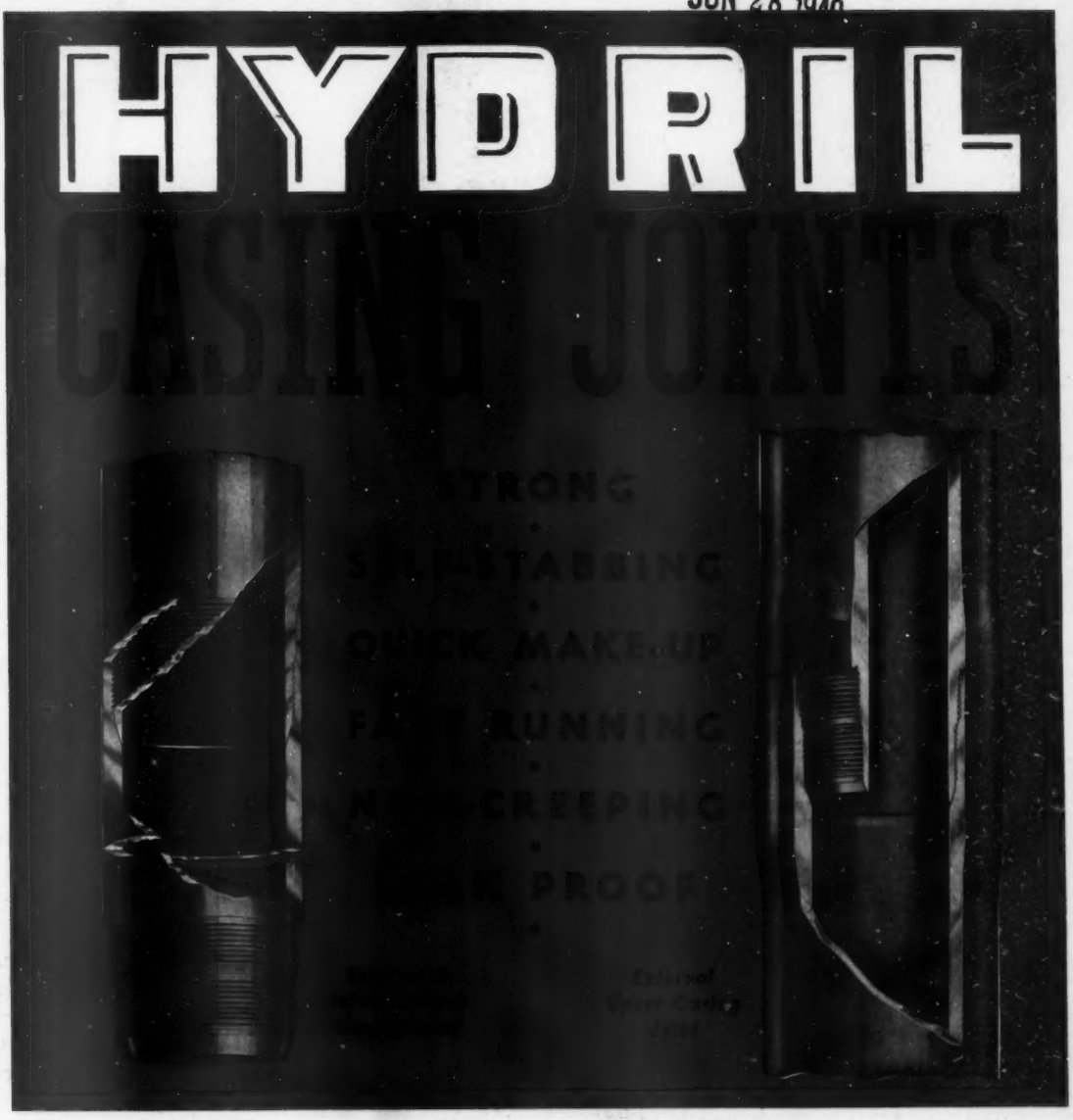

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HORTONSPHERES

• *Shown here are five of eight Hortonspheres which are installed at the Gulf Oil Corporation refinery and polymerization plant, Port Arthur, Texas. The eight spheres range from 2,500-to 7,500-bbls. capacity.*

Modern Pressure Storage Units

for handling CHARGING STOCK at POLY PLANTS

ONE of the major problems encountered in the operation of polymerization plants is the maintenance of a constant supply of charging stock. This problem is being solved effectively by installing Hortonspheres for pressure storage of recovered refinery gases and light stocks, such as butanes, received from oil fields. They are also used to store butanes and pentanes produced in fractionating units.

Hortonspheres are built in a wide range of capacities, from 1,000 to 20,000-bbls. or more, and for pressures of from 25 to 250 lbs. per sq. in. With proper pressure specified, the Hortonsphere will stop all breathing and boiling losses, and will also practically eliminate filling losses after the first filling. Similar performance and advantages are available through the use of Hortonspheroids for pressures of 30 lbs. per sq. in. or less.

No matter where your interests are, you will find it practical to choose exactly the right type of tank to meet your requirements. Hortonspheres, Hortonspheroids and Wiggins Roofs are available either direct from one of our three plants or from any one of our licensees, for any location. For information, please write our nearest office.

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PONTOON ROOFS
BREATHER ROOFS
BALLOON ROOFS
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HORTON
TANKS
SPHERES
SPHEROIDS
REFINERY TOWERS

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TULSA	1606 Hunt Building	CLEVELAND	2204 Rockefeller Building	SAN FRANCISCO	1054 Rialto Building
BIRMINGHAM	1538 N. Fiftieth Street	NEW YORK	3347-165 Broadway Building	LOS ANGELES	1423 Wm. Fox Building

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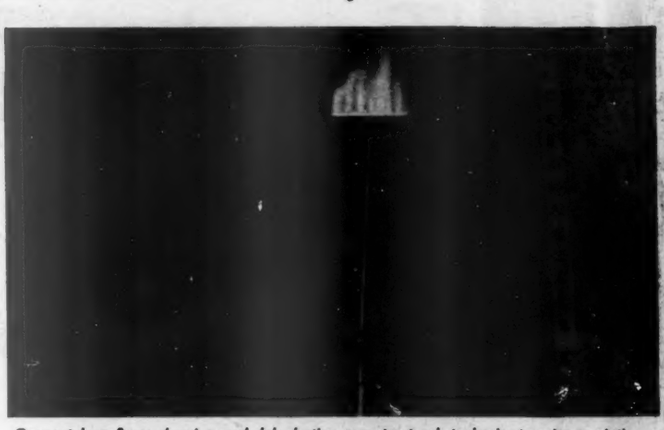


Oxyacetylene flame-cleaning and dehydrating new structural steel prior to primer painting.

Oxyacetylene paint-burning and surface-conditioning steel structures prior to repainting.

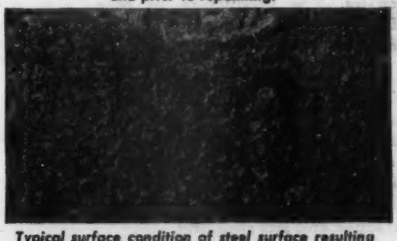
INCREASE THE LIFE of old Steel Structures

Moisture, the enemy of steel, must be removed from the surface prior to the application of paint since there is danger of its progressive action causing the gradual loosening of otherwise tight mill scale. The loosening of such scale may be the basic cause of primer paint coat failure and the exposure of the steel to progressive oxidation.

Airco oxyacetylene flame-cleaning and dehydrating, accepted by bridge engineers as an ideal method of steel surface conditioning of structural steel prior to primer painting of new steel and repainting of existing structures, is offered to the oil industry as a means to combat paint loss and to lower maintenance cost.* Write for your copy of "Flame Cleaning and Dehydrating Structural Steel The Airco Way."

*The oxyacetylene flame-cleaning and dehydrating process, a flame process, is not recommended for application on holders that have contained combustible liquids or gases.

Oxyacetylene flame-dehydrating after paint removal and prior to repainting.



Typical surface condition of steel surface resulting from loss of paint and progressive corrosion.

Surface fully conditioned and oxyacetylene flame-dehydrated prior to repainting.

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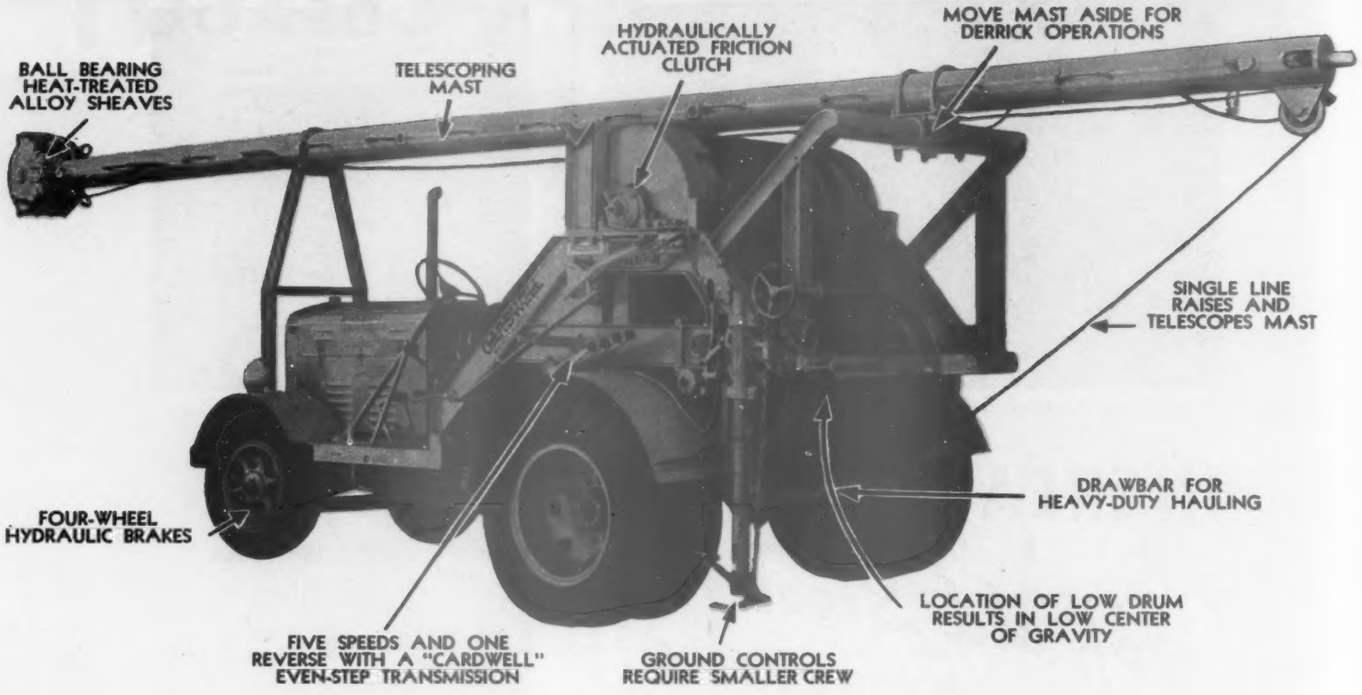
AIRCO *Anything and Everything for* GAS WELDING or CUTTING and ARC WELDING WILSON

The Oil and Gas Journal, issued weekly by The Petroleum Publishing Company, 211 South Cheyenne Avenue, Tulsa, Oklahoma. Subscription price: Domestic $6.00 a year; foreign, $7.00 a year. Entered as second-class mail matter December 15, 1911, at the post office at Tulsa, Oklahoma, under the Act of March 3, 1879.

THE IMPROVED "CARDWELL" MOBILHOIST


BALL BEARING HEAT-TREATED ALLOY SHEAVES
TELESCOPING MAST
HYDRAULICALLY ACTUATED FRICTION CLUTCH
MOVE MAST ASIDE FOR DERRICK OPERATIONS
SINGLE LINE RAISES AND TELESCOPES MAST
DRAWBAR FOR HEAVY-DUTY HAULING
FOUR-WHEEL HYDRAULIC BRAKES
FIVE SPEEDS AND ONE REVERSE WITH A "CARDWELL" EVEN-STEP TRANSMISSION
GROUND CONTROLS REQUIRE SMALLER CREW
LOCATION OF LOW DRUM RESULTS IN LOW CENTER OF GRAVITY

NEW SINGLE ADJUSTMENT FULLY EQUALIZED, DUAL SAFETY BRAKES
9.75 x 24, 14 PLY DUAL OR SINGLE HEAVY-DUTY TIRES
NEW 19,000 LB. CAPACITY REAR AXLE GIVES 30% SLOWER SPEED IN LOW
CONSTRUCTED OF FEWEST PARTS WITH EVERY WEARING PART HEAT-TREATED
ROAD WIDTH
95½" WITH SINGLE TIRES
111¼" WITH DUAL TIRES
DUALS AND EXTRA FENDERS QUICKLY REMOVABLE

AFTER two years of successful operation, we now offer the improved "Cardwell" Mobilhoist with a new braking system, heavier axle, slower road speed, dual tires and many other improvements that increase its usefulness, lengthen the service life and reduce repairs. The production of over seventy of these rigs since January, 1938, is evidence of the definite need for a rig of this type.

This Mobilhoist with mast can move in, rig up and start well servicing operations in less than an hour as the lines can be carried reeved up on the mast. When the Mobilhoist is to be used under a derrick, the lower end of the mast may be shifted aside or the mast may be detached and left standing.

A special "Cardwell" even-step, five-speed transmission speeds drilling and servicing operations 20%. This transmission makes a 90 HP engine as fast as a 110 HP engine would be with the regular truck transmission. Five speeds and one reverse are available to both drums, rotary table drive or spudder, and when driving on the highway. This Mobilhoist is designed especially for oil field use. It is not built around a farm tractor because of the slow drum speeds available and the limited choice of drum locations.

"Cardwell" Mobilhoist is built of top grade steels, with every wearing part heat-treated. This all-steel construction, exclusive with "Cardwell," eliminates excessive weight and reduces costly down time.

"Cardwell" Mobilhoist is recommended for servicing, rods and tubing, bailing and swabbing to 4,000 feet; cleanout, well deepening or drilling-in behind rotary with cable tools to 3,600 feet; rotary drilling with 3½" drill pipe to 2,000 feet or rotary servicing with tubing or 2⅞" drill pipe to 4,000 feet.

Send for performance data, specifications and prices; or see your nearest "Cardwell" representative.

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This Ideal Combination reduces Threading Cost 80%

A western oil fields supply company uses a 4" LANDMATIC Head and a 3" Landis Collapsible Tap to form an ideal combination for performing successive external and internal threading operations.

The 4" LANDMATIC Head is equipped with a taper attachment and is used to cut 4" American Std. Pipe Threads on oil well tool joints, while the 3" Landis Collapsible Tap is used to cut a 3" American Std. Pipe Thread within the bore of the same piece.

An average of 200 threads are cut per grind of the chasers, of both the LANDMATIC Head and Collapsible Tap. The actual cost of threading this job—by installing this *Ideal Combination*—was reduced to 10 cents each, from a former cost of 50 cents each.

The superintendent of this western supply company says—"This equipment has been in continuous service for 10 years with absolutely no trouble or upkeep except for replacement chasers, and in the past 10 years, we have used only 3 sets.

"We would not consider using any other threading equipment. In addition to the 4" LANDMATIC Head and the 3" Landis Tap, we also use a 4" Landis Pipe Threading and Cutting Machine and a 2" LANDMATIC Head."

To be assured of threads of true form, correct lead, and quality finish; and for the utmost economy of operation—
LANDISize your Threads.

The name of this Landis user will be given upon request.

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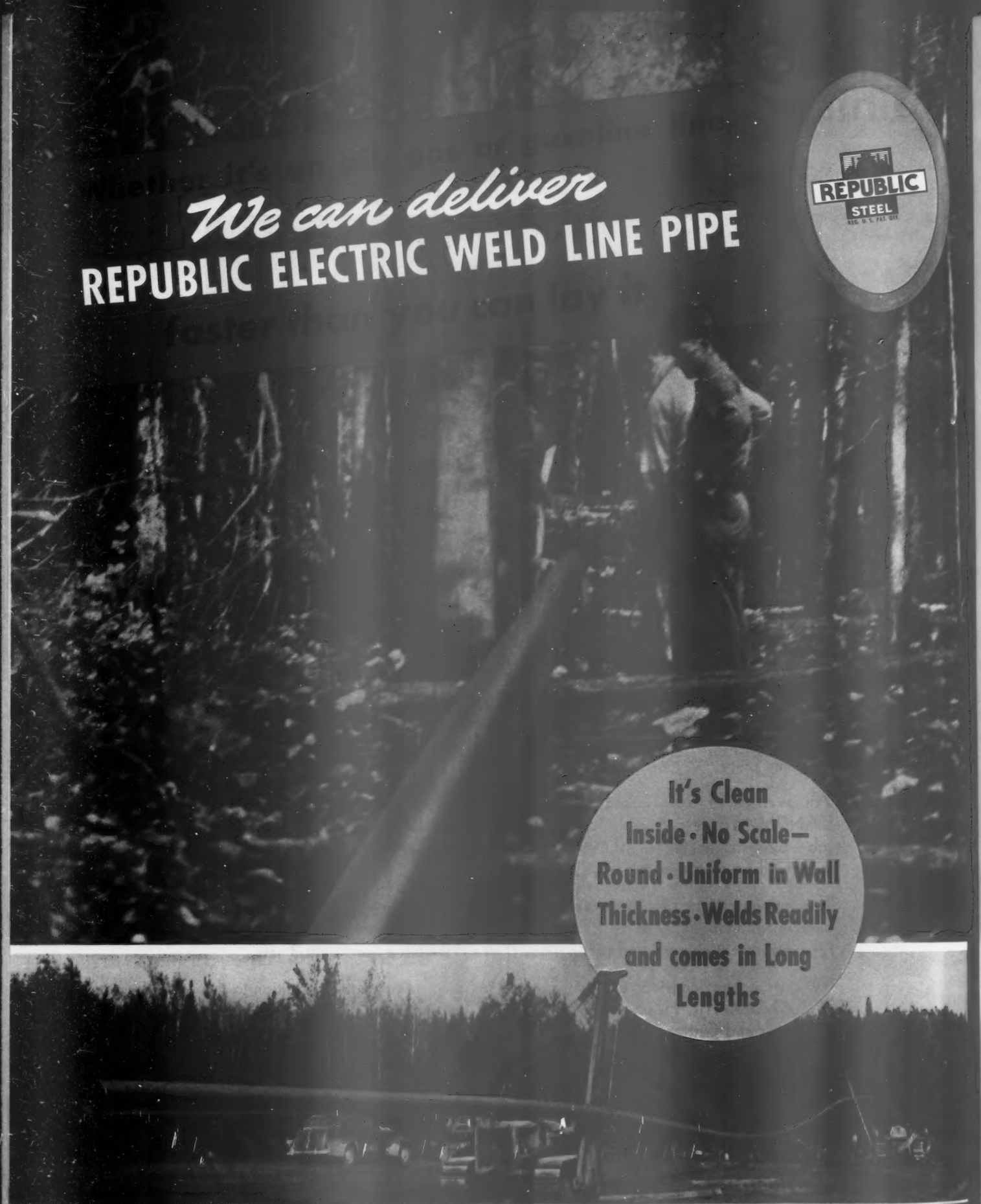

REPUBLIC STEEL CORPORATION

NEW IMPROVED Thermoid ROTARY HOSE SETS A NEW PACE IN THE OIL FIELDS

No. 3520 Thermoid Rotary Hose

Five years ago Thermoid pioneered Rotary Hose for the most severe service on newly developed compounded and heavy duty oversize pumps then in use. That hose turned in highly satisfactory performance, but as usual Thermoid didn't stop there. Constant checking, testing, and improving of specifications by our Oil Field Engineers resulted in further improvements in Thermoid Rotary Hose which were announced two years ago.

Now, after further development and research in the oil fields, Thermoid announces an even superior line of Rotary Hose, available in four distinct constructions . . . one for each basic drilling condition. They are as follows:

1. SHP—Built to withstand an initial test pressure of 7500 lbs. Reinforced with 6 layers of high-test giant wire applied at carefully calculated reverse angles for maximum flexibility and resistance to elongation. USES: For deep drilling under today's high pressures.

2. #3520—Built to withstand initial test pressure of 5000 lbs. Reinforced with three layers of braided wire applied at reverse angles for maximum flexibility, plus a special crescent-shaped wire that adds greatly to the strength of the hose. USES: For all regular drilling.

3. #3300—Built to withstand initial test pressure of 4000 lbs. Constructed with 2 layers of braided wire reinforcement, supplemented by an additional coil of crescent-shaped high-test wire for overall strength. USES: For regular drilling when low pressures are used.

4. #3250—Built to withstand an initial test pressure of 3000 lbs. Constructed with 2 layers of braided reinforcing wire applied at reverse angles for maximum flexibility and resistance to elongation. USES: For shallow drilling at low pressures.

The right hose for each type of drilling operation, plus greater basic strength naturally leads to longer service . . . and lower costs per foot of drilling.

NEW BUILT-IN COUPLING

Adding to the efficiency and economy of Thermoid Rotary Hose is a coupling that is really "built-in". Because it actually becomes an integral part of the hose itself, you are assured these important advantages:

- ★ Smooth, uninterrupted flow.
- ★ Strong reinforcement at the end of the hose.
- ★ Positive elimination of coupling leaks and failures.
- ★ Easily replaceable coupling head.
- ★ Complete coupling is considerably lighter in weight.
- ★ Simplicity of contour, superior strength and ruggedness.

Get Your Copy of the New Catalog on Thermoid Improved Rotary Hose Now!

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DRILLING BELTS
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BRAKE BLOCKS

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THE CASE* OF THE FLOODED DITCH

SOLVED WITH PREVENTIVE MAINTENANCE

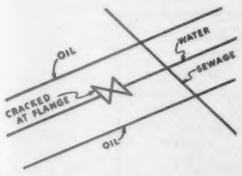
"It's criminal, I say," cried the CHIEF ENGINEER, "... the plant can't get enough water and yet we're almost flooded."

"It's that valve," said the PIPING FOREMAN, ". . . the end flange cracked open."

"No matter what the cause," said the CRANE MAN, "Preventive Maintenance with the right Crane valve will stop it."

WE haven't a record of the actual words of these men, but they must have spoken something like that. Because the facts at hand bear out the danger and annoyance of the situation.

A big north central refinery brought in water at 60-pound pressure, with an 8-inch line installed in a ditch. Later, other lines carrying oil and even sewage were laid over and across the water pipe as shown in the sketch. Shortly thereafter, the trouble started.



Settling of the water line may have been responsible, or perhaps strains caused by the other piping brought on the trouble. But, whatever it was, it resulted in crippling the refinery's water supply. The main shut-off down in the ditch, a sturdy iron body gate valve, couldn't hold the twist of the piping. It gave way at the end flange.

As ordinary maintenance would have it, the valve might have been replaced with another of the same kind. But to be sure that the trouble wouldn't happen again, the Engineer saw that Preventive Maintenance—as suggested by H. M. M., the Crane Representative—was necessary. It counseled a stronger guard against trouble at the source: a valve with greater resistance to external strains—a Crane 150-pound steel valve.

Results: (1) No recurrence of the trouble. (2) No more dangerous and costly loss of water. (3) Another user of piping was convinced of the sound economy of Preventive Maintenance, and of looking to Crane for the right valves and fittings for every need, common or extraordinary; also of the wisdom of calling in the Crane Man on every problem of flow control.

**This case is based on an actual experience of a Crane Representative in our Chicago Branch.*

HERE'S PREVENTIVE MAINTENANCE for 150-Pound Lines

In 150-pound services up to 500°, you've a better chance of avoiding crippled piping and high maintenance costs by installing Crane No. 47X Cast Steel Valves. They'll give you the kind of dependability you need with an extra liberal margin of safety. They'll keep your flow-control costs down to a reasonable figure. You will find these Crane valves "handmade" for a lot of needs in your plant—in water, steam, oil, gas, and air lines.

Crane Steel Valves are made for every refinery service—for all pressures and temperatures. They're available in gate, globe, angle, and check patterns, in a complete range of seating materials. Ask your Crane Representative to explain the value of Preventive Maintenance with Crane steel valves.

Crane No. 47X Steel Valve, Gate Pattern

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"F X" SLUSH PUMPS
FOR 24-HOUR-A-DAY SERVICE

Here are the mechanical features and operating advantages that explain why Gardner-Denver Steam and Power Slush Pumps are so often FIRST CHOICE for 24-hour-a-day service.

1 **Divided Fluid Cylinder Construction—no inner baffles or metal sections to be cut through by mud.**

2 **Regular equipment includes *Slush-Proof* hardened liners and rods—*Slush-Proof* valves of the dual seating type and *Slush-Proof* one-piece pistons.**

3 **Oil-stop and mud-stop heads prevent entrance of mud and water into power end.**

4 **Main power frame is a rugged, one-piece casting designed for severe shock loads.**

5 **Automatic, positive flood lubrication to all working parts without oil pipes or tricky adjustments.**

We shall gladly send you complete information on the entire line of Gardner-Denver Steam and Power Slush Pumps. Write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER "F-X" POWER SLUSH PUMPS

Size	Capacity U. S. Gallons per minute	Maximum Pressure	B. H. P.
7¼ x 10	450	365	100
7¼ x 12	495	430	150
7¼ x 14	577	550	200
7¾ x 16	693	575	250
7¾ x 20	774	800	400

All sizes may be furnished with reduced sizes of liners and pistons for higher pressures.

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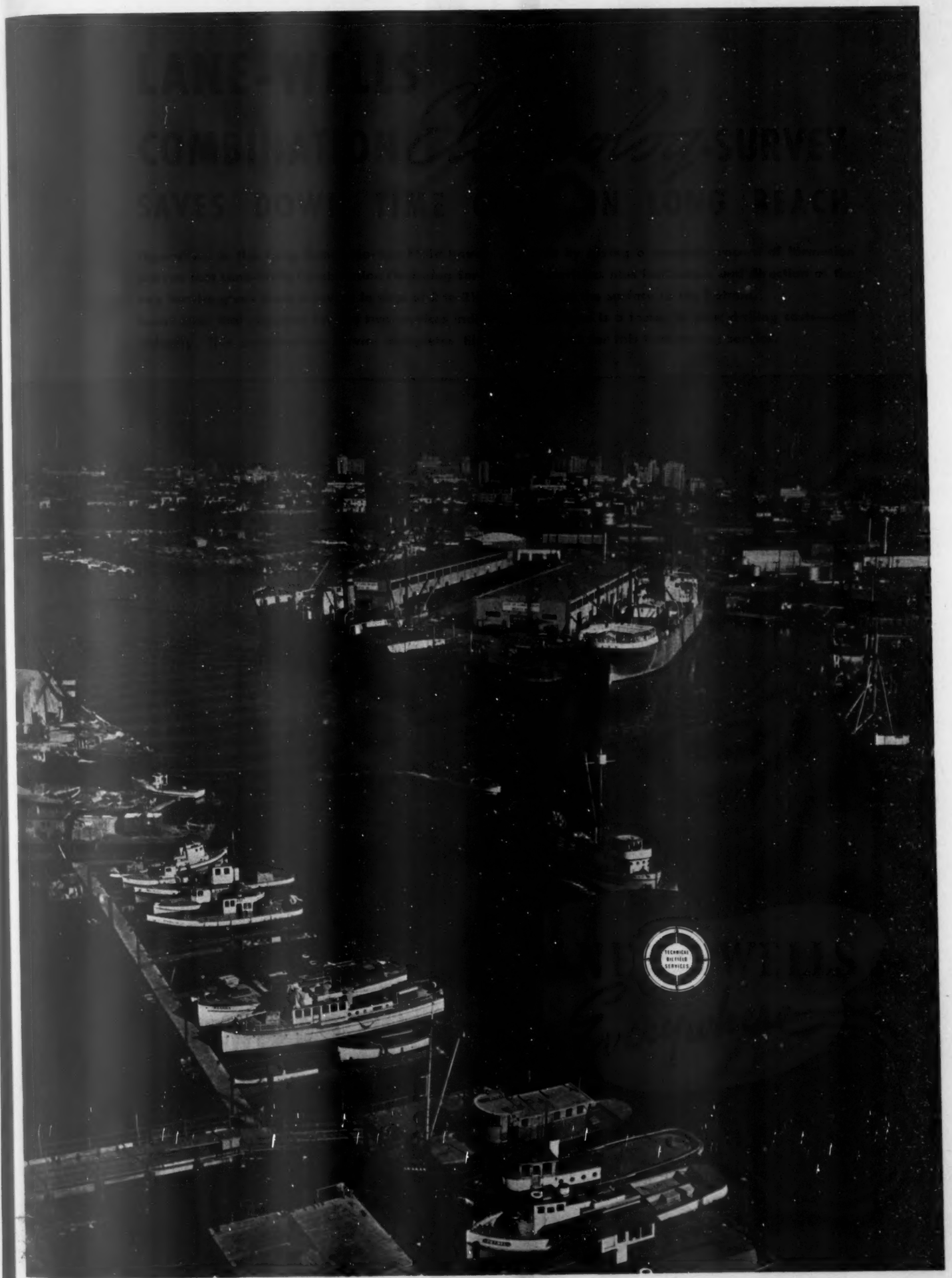

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"SERVICE IS OUR MIDDLE NAME!"

Cities Service Oil Companies are engaged in every phase of the oil business — producing, refining, transporting, distributing and marketing. Seven strategically located, efficient refineries supply thousands of Cities Service dealers with petroleum products the equal of any made today, and superior to most. Expert chemists are ever watchful that each product meets the rigid standards and specifications that Cities Service demands.

Cities Service products range all the way from those which supply ordinary automotive needs to heavy industrial lubricants. The courteous, helpful efficiency of more than 16,000 Cities Service gasolene and motor oil dealers in 38 states has established the truth of the promise—"Service is our middle name."

The vast experience of Cities Service in every phase of the oil business makes Cities Service engineers a natural choice for consultation on your industrial lubrication problems. The nearest Cities Service office will be glad to put you in touch with the Free Lubrication Engineers' Service—without obligation, of course.

For 14 years, the Cities Service Concert has delighted millions of listeners on Friday evenings. It stars lovely Lucille Manners (shown above), Ross Graham, and the Cities Service Singers and Orchestra, under the direction of Frank Black, over the NBC Red Network.

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CABLE TOOLS

WHERE ECONOMY COUNTS *Use* CABLE TOOLS

In drilling a well, the fundamental problem still remains one of economy. Compare all costs *before* you drill—then choose the drilling method that is best for each particular job. If it's the cable system, remember that Spang Tools offer the greatest value for your money.

How often have you heard someone say, "This costs less than a Spang Tool," or "Just as good as Spang"? Such statements are frequent, because Spang Cable Tools have definitely become *the standard of comparison* for cable tools.

Down through the years, Spang & Company have won and held a position of unchallenged leadership in cable-tool manufacture. No idle boast, this, because *our* wealth of experience enables us to give *you* the best in cable tools.

Every Spang Tool is an investment that pays dividends. Specify Spang.

The HIGHER STANDARD

SPANG & COMPANY · Butler, Pa.

SPANG CABLE TOOLS

Identical

You couldn't tell them apart—and for good reason. A clever photographer has taken three pictures of one child and fitted them together to look like triplets.

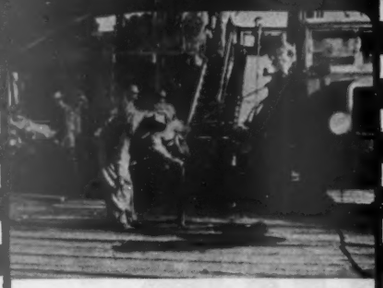
All three tube problems (corrosion, oxidation and pressure) are resolved into one when you utilize the services of our tube experts. Think in terms of this one fundamental problem—tube expense—and we will show you how to establish the proper ratio of tube cost and tube life to effect the greatest possible economy.

TIMKEN Sicromo (resistant to oxidation and corrosion) and TIMKEN DM (resistant to pressure) tubes do the trick. They're intermediate in price and superior in performance. Consult us today.

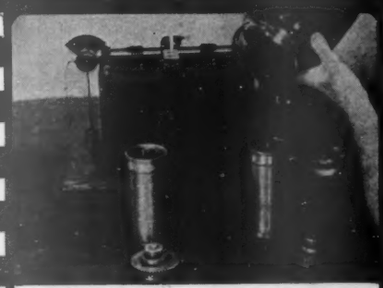
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
SEAMLESS STEEL TUBES

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

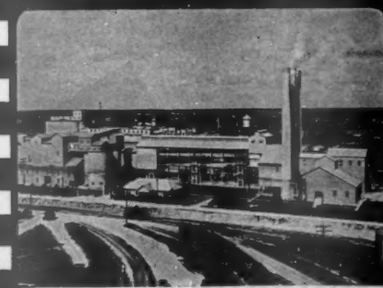


DAY IN AND DAY OUT, Lone Star's oil-field service organization studies cementing problems at the rig, to keep the factory posted on field requirements.



OIL-WELL CEMENT RESEARCH goes on constantly . . . cement is tested for needed qualities and properties.

CEMENT BRIQUETTES are stored in sulphate solution; some cements disintegrate—'Starcor' proves its extra sulphate resistance.



IN PLANT OPERATION, rigid quality control assures cement of unvarying uniformity—made to measure for oil-field use.

'MADE TO MEASURE' FOR OIL FIELD SERVICE

EVERYBODY likes a money-player . . . the kind of a guy who does his best when the money's on the line . . . the hitter you can depend on in a pinch. Yes, and the cement that always comes through when the going's tough. An Oil Man's Cement—'Starcor'*—with greater length and ease of pumpability needed for deep, hot holes. And 'Incor'* for wells of moderate depth, earlier drill out, wells on production quicker.

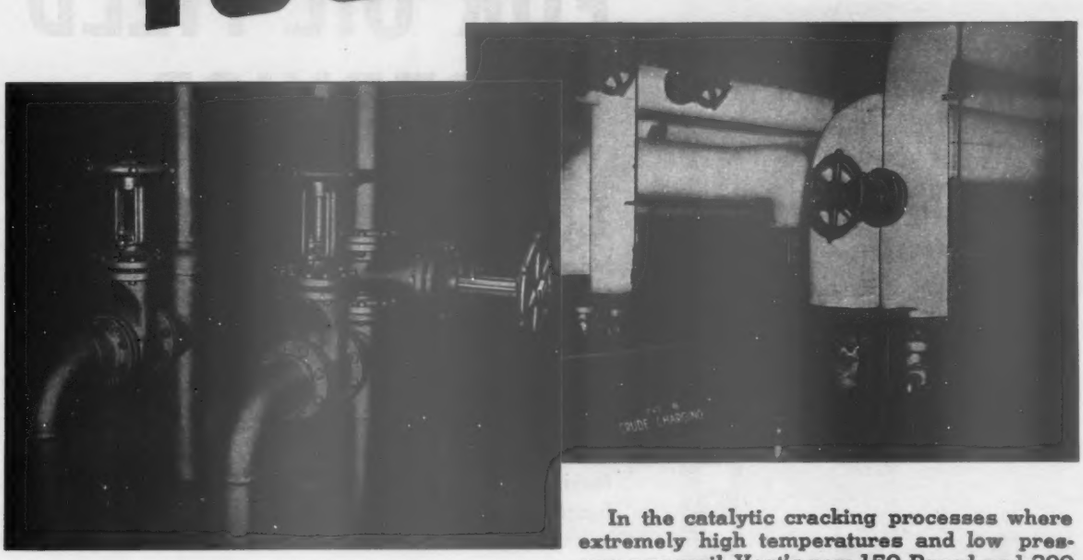
Cements kept abreast of the changing needs of oil-industry service by continuing research, in the field and laboratory. Making it possible to say, in the future as in the past—"When better cements are made, Lone Star will make them."

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

DALLAS: Santa Fe Building . . . . HOUSTON: Shell Building

Doing a TOUGH JOB!



Vogt

150 AND 300 POUND DROP FORGED STEEL GATE VALVES

In the catalytic cracking processes where extremely high temperatures and low pressures prevail, Vogt's new 150 Pound and 300 Pound, A. S. A. DROP FORGED STEEL Gate Valves are successfully operating under severe conditions.

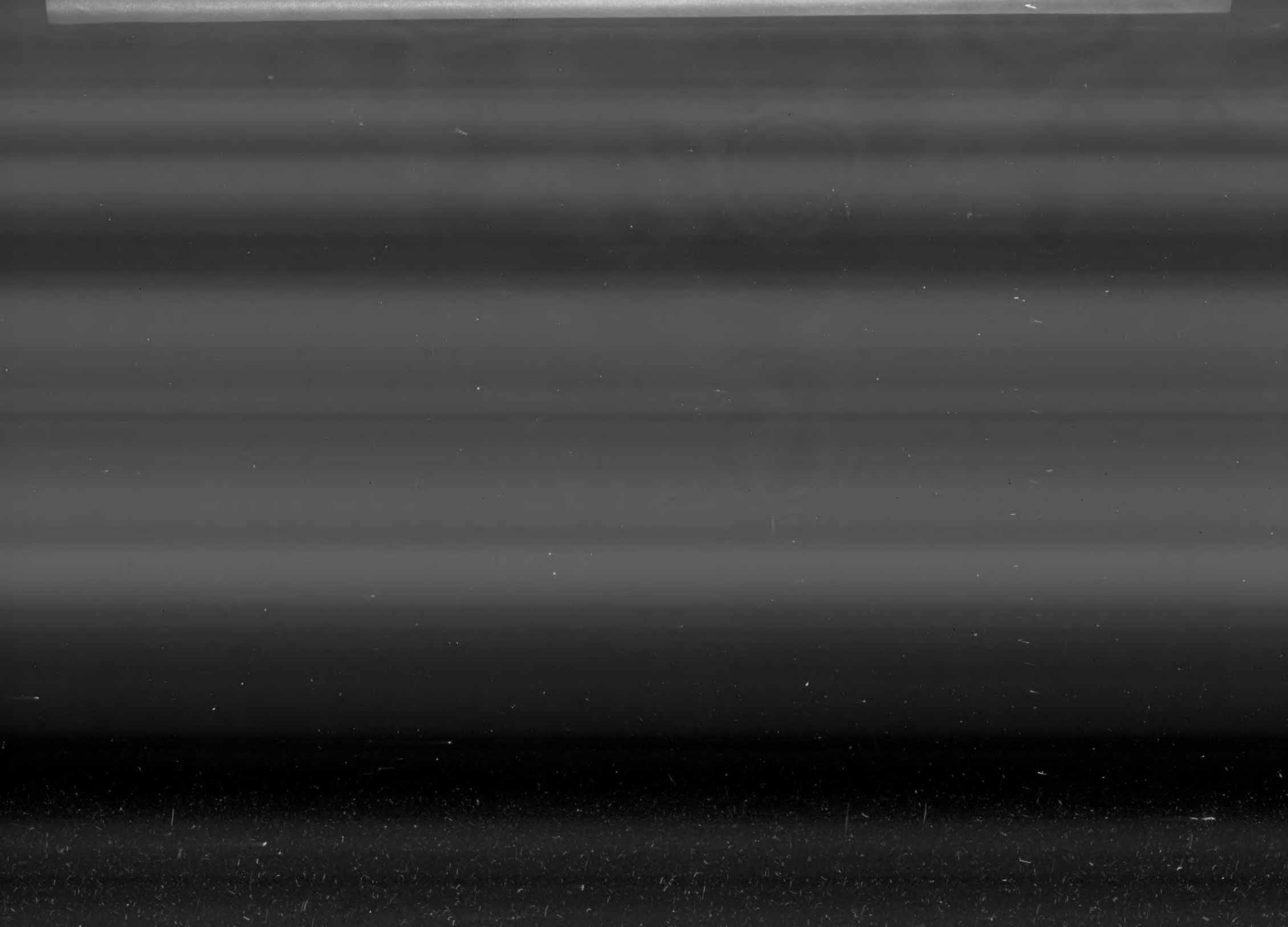
The standard temperature rating for 150 Pound valves is 500° F.; Vogt rates its construction at 750° F.; but the Vogt drop forged carbon steel valves shown above are OPERATING REGULARLY AT 850° F. in one of the world's largest refineries.

These valves feature (1) all flanges forged integral with extra thickness to newest A. P. I. specifications, (2) round, bolted, one-piece bonnet, (3) oversize stuffing box, (4) removable yoke nut, (5) solid wedge gate, (6) heat treated stainless steel trim, (7) high temperature studs and nuts, (8) materials up to Vogt "high pressure" standards.

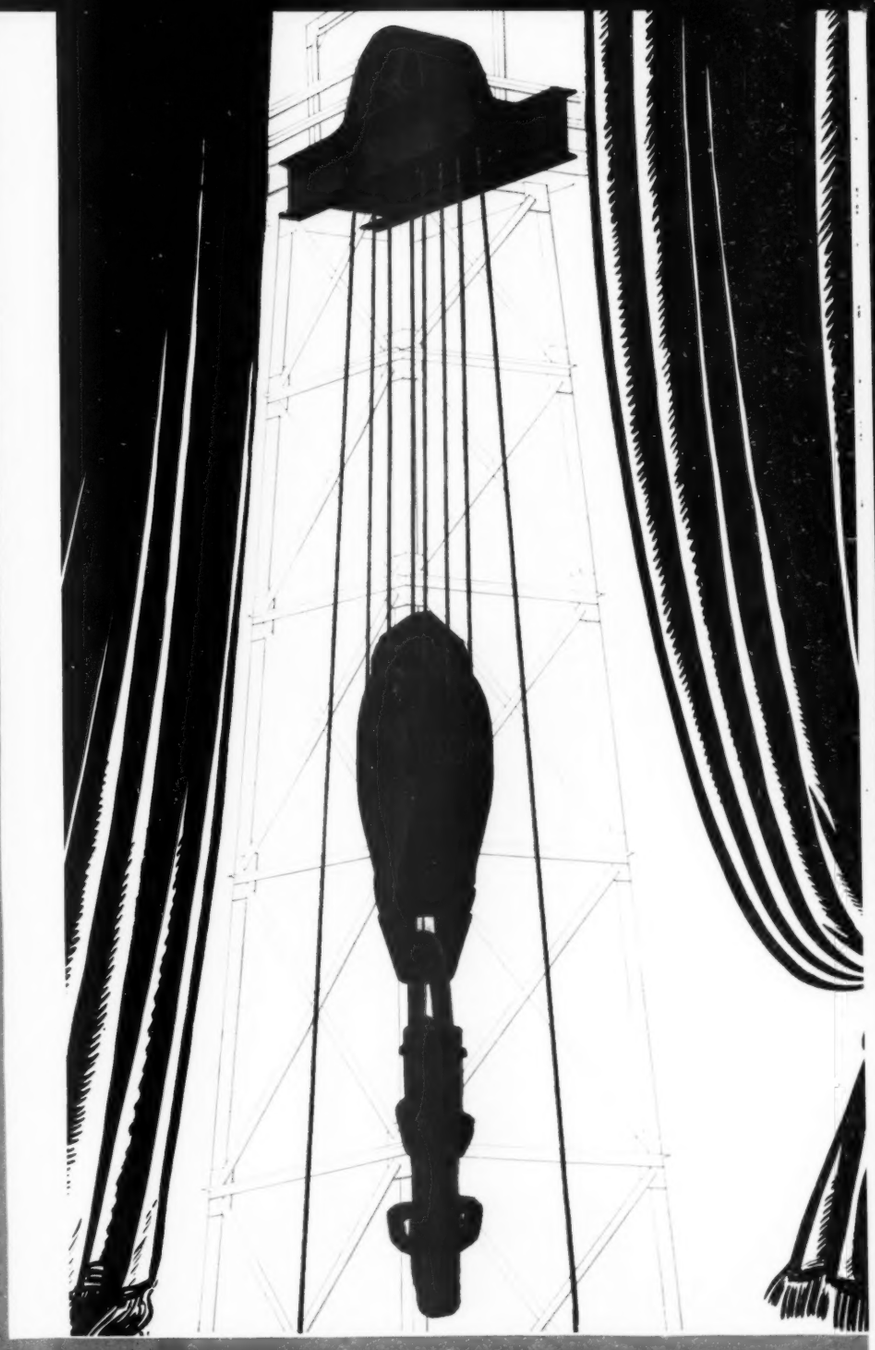
For doing a tough job... it's VOGT for Valves!

HENRY VOGT MACHINE CO., INC., LOUISVILLE, KY.

Branch Offices: NEW YORK • PHILADELPHIA • CLEVELAND • CHICAGO • CINCINNATI • ST. LOUIS • DALLAS



Presenting
REGAN SLIM HOLE HOOK-UP



CROWN BLOCK
4-Sheave—135 Tons
36" Sheaves

TRAVELING BLOCK
3-Sheave—100 Tons
30" Sheaves

COMBINATION HOOK
Cast Steel—100 Tons

STANDARD REGAN DESIGN

In answer to the insistent demand of drilling operators in fields where the shallower depths prevail, Regan has developed a light-capacity "slim hole" hook-up consisting of crown block, traveling block and combination hook. Operators can now obtain in this medium-duty string-up the standard Regan quality and the identical principles of design and construction that have proved so eminently successful in the world's deepest drilled fields. Coupled with economy of first cost and service you have at your command the latest type of modern equipment, specially designed for "slim hole" drilling. Again, it's Regan, first with the latest!

Type FL Crown Block—height 38½", length 96", width 27⅛". Type F Traveling Block—height 84", width 20", depth 33½". Combination Hook—height 88", width 23", depth 18".

New Bulletin just issued. Ask for copy.

Regan
Forge & Engineering Co.

Mid-Continent Office:
1502 Maury St.,
Houston, Texas
R. A. Hill, Mgr.

Oklahoma and Kansas
Representatives:
Boweird Supply Co.
Tulsa and Wichita

New York City Office: 17 Battery Place—Geo. R. Woods, Mgr.
GENERAL OFFICES and PLANT: SAN PEDRO, CALIF.

ELECTRIC DRIVE
Is the Simplest Drive

That's why it has these money-saving advantages for well pumping:

1. Low first cost
2. Low maintenance cost
3. Long life and high salvage value
4. Portability
5. Ease of installation

G-E 5-hp, high-starting-torque, low-starting-current, splashproof induction motor driving pumping rig

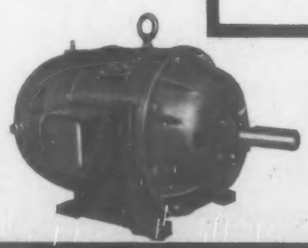
1. THE STATOR—In effect, a single unit. Windings strongly bonded by the insulating varnish and held firmly in place. Feet cast integrally with the frame.

2. END SHIELDS are of splashproof design and so help eliminate the need for additional housing, besides furnishing rigid bearing support.

3. THE ROTOR—The only moving part. One-piece, indestructible, cast-aluminum construction. The ball bearings are sealed in dust-tight housings, which allow disassembly of the motor without exposing the bearing to dust, dirt, and moisture. Their occasional inspection and lubrication are about all the attention the motor requires.

DESPITE its simplicity, electric drive can be furnished with operating characteristics to meet all kinds of pumping loads. It is inherently efficient, and it is economical because the power consumed is in proportion to the pumping load. It is easy on the mechanical equipment because it eliminates stresses on the rods and other parts of the rig. And it enables you to pump automatically, according to whatever schedule you lay out.

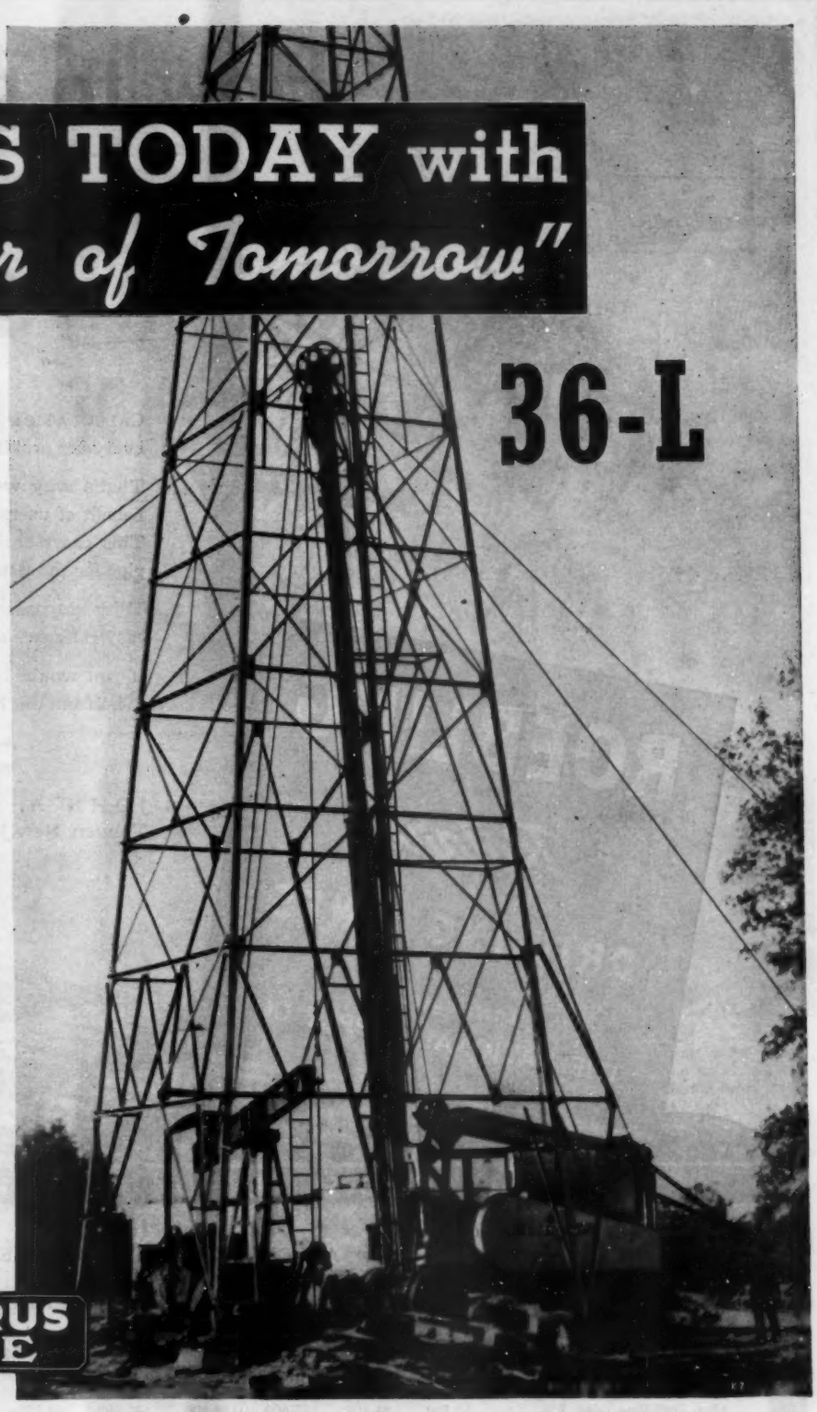
Here's a suggestion: when you begin to make plans for putting some of your wells on pump, get in touch with the nearest G-E representative. He'll be glad to go over your requirements and show you how electric drive fits the situation. General Electric, Schenectady, N. Y.



G-E Totally Enclosed, Fan-cooled Motor for Well Pumping This motor is protected against rain, dust, and dirt and is particularly suited for long-time operation under any weather conditions. Like the G-E splashproof motor, it can be furnished in double- or triple-rated design to handle a variety of pumping loads

GENERAL ELECTRIC

CUT COSTS TODAY with "The Spudder of Tomorrow"



36-L

The new Bucyrus-Erie 36-L has the ability to handle drilling tools equal to 1/5 the total weight of the complete machine; handles over 4,500 lbs. of tools in shallow holes or combined weight of 6,000 lbs. to 7,000 lbs. of tools and cable in deeper holes.

Has ample power to pull 3,500 lbs. of tools from 3,000 ft. hole in 8 minutes; average hoisting speed 375 feet per minute in high gear. Low gear makes available drilling line pulls up to 27,800 lbs. at reduced hoisting speeds.

Sand reel in high gear has ample power to pull 7"x30' bailer from 3,000 foot depth in 3½ minutes. Low gear allows sand line pulls up to 10,000 lbs. at reduced speeds.

Calf reel in high gear on 4th layer has a line pull up to 6,000 lbs. and hoisting speed up to 460 ft. per minute. Low gear has a line pull up to 13,000 lbs. and hoisting speed up to 188 ft. per minute. Calf reel line pulls and speeds are calculated with 200 ft. of ⅞"casing line on drum which is sufficient for six part tackle.

Trailer mounting for haulage at truck speeds permits moving over any highway. Base of machine frame is flush and smooth on bottom to allow entire unit to be loaded on oil country truck, landed on floor of standard derrick or mounted on mud boat. Derrick and braces, which are compactly folded on top of frame when moving can be completely set up in 20 minutes.

Investigate the possibilities of cutting your costs with this new Big 36-L. Write for bulletin today.

BUCYRUS ERIE

LOOK OVER THE 24-L

This smaller companion machine swings up to 2,500 lbs. of tools, has ample capacity to drill and swab to 2,000 ft. Average hoisting speed on the bull reel is 355 F.P.M. Sand reel is chain driven, has an average hoist speed of 900 F.P.M. This smaller spudder is also of all steel welded construction in a welded trussed box frame. Derrick is 40 foot telescoping. Gasoline engine is rated at 41 horsepower at 1,600 R.P.M. Diesel engine or electric power are available.

Ask for the bulletin on the 24-L, too. It gives complete information on this popular all modern spudder. Other sizes are also available.

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE • WISCONSIN • U.S.A.

How to get more life *from rotary drilling lines!*

CALCULATION OF LOADS HANDLED by rotary drilling lines is an everyday problem on rotary drilling rigs.

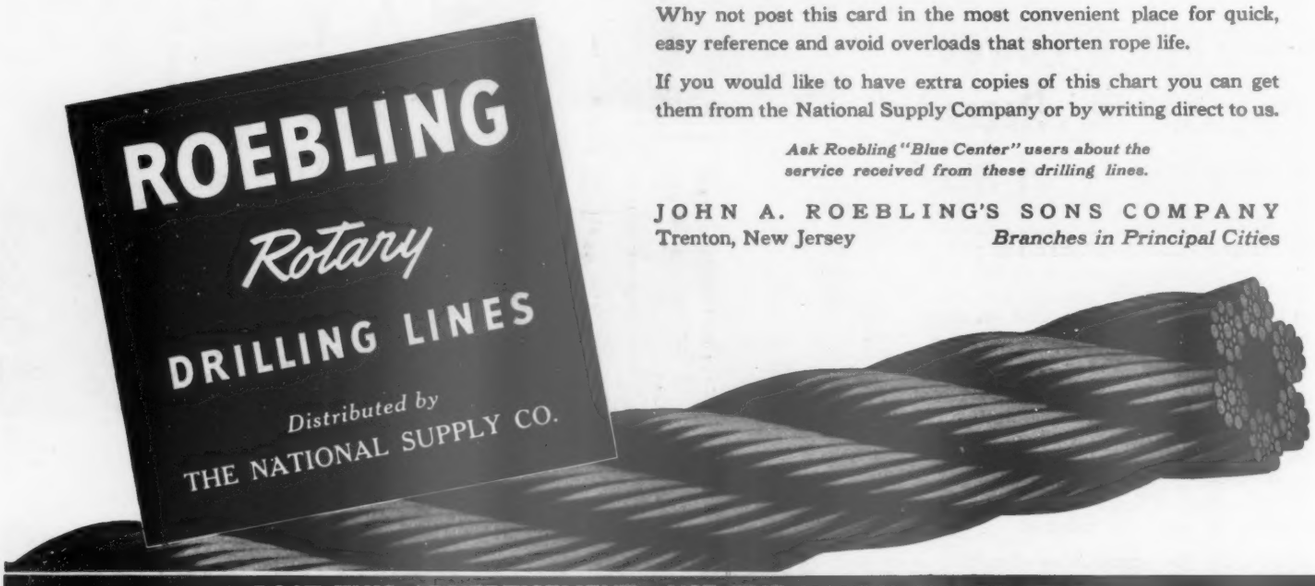
That's why we are publishing the handy chart below—for the benefit of users of Roebling "Blue Center" Rotary Drilling Lines. This chart enables you to quickly determine the weight of drill pipe for the usual stringing job.

Why not post this card in the most convenient place for quick, easy reference and avoid overloads that shorten rope life.

If you would like to have extra copies of this chart you can get them from the National Supply Company or by writing direct to us.

Ask Roebling "Blue Center" users about the service received from these drilling lines.

JOHN A. ROEBLING'S SONS COMPANY
Trenton, New Jersey — *Branches in Principal Cities*



POST THIS ADVERTISEMENT— USE THE HANDY CHART BELOW

ALLOWABLE DRILL-PIPE LENGTHS

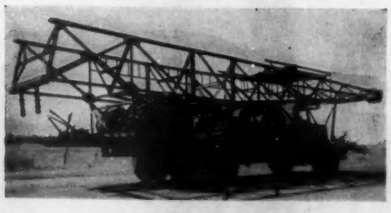
FOR ROEBLING "BLUE-CENTER" STEEL ROTARY DRILLING LINES

Line Size		1-In.				1⅛-In.				1¼-In.			
Lines Up		6	8	10	12	6	8	10	12	6	8	10	12
Max. Line Load, Lb.		89,400	114,300	137,800	158,500	112,800	144,200	173,800	200,000	138,300	176,900	213,200	245,300
Max. Drill-Pipe Load, Lb.		59,400	84,300	107,800	128,500	82,800	114,200	143,800	170,000	108,300	146,900	183,200	215,300
Drill-Pipe Size (Inches)	Weight of Drill Pipe (Pounds Per Feet, with Couplings)	Feet				Feet				Feet			
8⅝	40	1,485	2,115	2,700	3,215	2,070	2,855	3,595	4,250	2,710	3,675	4,585	5,385
7⅝	29.25	2,030	2,885	3,690	4,400	2,830	3,905	4,920	5,815	3,705	5,025	6,275	7,360
6⅝	31.9	1,865	2,645	3,380	4,030	2,595	3,585	4,510	5,330	3,405	4,605	5,755	6,750
	25.2	2,360	3,345	4,280	5,100	3,285	4,545	5,710	6,750	4,305	5,830	7,285	8,545
	22.2	2,675	3,800	4,860	5,790	3,730	5,155	6,480	7,660	4,885	6,620	8,265	9,700
5½	25.2	2,360	3,345	4,280	5,100	3,285	4,545	5,710	6,750	4,305	5,830	7,285	8,545
	22.2	2,675	3,800	4,860	5,790	3,730	5,155	6,480	7,660	4,885	6,620	8,265	9,700
	19.0	3,130	4,440	5,680	6,765	4,360	6,025	7,570	8,950	5,705	7,735	9,655	11,335
4½	16.6	3,580	5,080	6,500	7,740	4,990	6,885	8,665	10,240	6,530	8,850	11,055	12,970
	13.75	4,320	6,130	7,840	9,345	6,025	8,315	10,460	12,365	7,885	10,685	13,335	15,660
	12.75	4,660	6,615	8,460	10,080	6,495	8,975	11,280	13,335	8,505	11,525	14,405	16,890
3½	13.3	4,470	6,340	8,110	9,665	6,225	8,610	10,815	12,785	8,155	11,045	13,805	16,190
	11.2	5,310	7,530	9,620	11,475	7,395	10,210	12,840	15,130	9,670	13,120	16,385	19,225
	8.5	6,990	9,920	12,690	15,120	9,745	13,455	16,920	20,005	12,755	17,285	21,605	25,330

NOTE: Maximum load capacity of 1", 1⅛" and 1¼" line with factor of safety of 5 = 16,800 lb., 21,200 lb. and 26,000 lb. respectively. 30,000 lb., estimated average weight of drill collars, drill stem, and traveling-block assemblies deducted from maximum line loads to obtain maximum drill-pipe loads.

This table is based on data shown in "A.P.I. Standards No. 9-A: A.P.I. Specification for Wire Rope" dated April 1940, and printed by permission.

Pioneer FRANKS MFG. CORP. Drilling Rig ON WHEELS "MAKING HOLE" ON 48th LOCATION IN KANSAS



Over-the-road position of derrick.

One of the original "Slim-Hole" Rigs to be used in Kansas. This Franks rig was delivered to a major oil company, and drilling began in Kansas on Nov. 15, 1937. This same unit is now drilling two wells per month near Hoisington.

Franks makes three truck type models; two trailer type models; and four skid type models for deep "slim-hole," exploratory and standard medium depth drilling.

Maintained Lowest Cost Per Ft. Record on 161,232 Ft. of Hole in Western Kansas

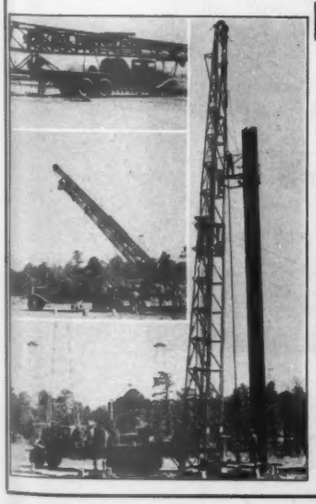
This lowest cost, as given to Franks by a major oil company, includes every item of expense: labor, water, fuel, transportation, supplies, repairs, and depreciation on rig and drill pipe. Write Franks for actual cost record on this unit.

Advantages of Franks "Slim-Hole" Rigs

- **GREATEST MOBILITY OF ANY RIG.**
  For comparable capacity, Franks rigs on wheels facilitate fastest rigging-up and tearing-down of any unit yet produced. Decking and flooring all rig-up necessary. In moving from location-to-location even the blocks remain strung, and tongs hung. Pumps permanently hooked-up. Unit moves under its own power.
- **FASTEST RIG-UP OF ANY RIG.**
  Derrick raised by power screw in few minutes. Fewer bolts to fasten or adjustments to make before unit ready to drill.
- **GREATER OPERATING ECONOMY.**
  Franks rig designed for three-man crew, thus affording saving over most units in labor costs. Utmost economy in fuel, and water effected. Compounding of truck motor with auxiliary motor on unit makes full use of truck investment.
- **GREATER FLEXIBILITY.**
  Friction driven throughout with friction clutch even on final drum drive, enabling operator to start any part of unit with engines running at full speed. Superior arrangement of drawworks. Cathead more conveniently located. Compounding of motors facilitates faster trips.

Write or phone for information, or see the Franks section in the Composite Catalog or Producing Equipment Directory.

Franks Derrick on Wheels Save Cost of 90 Servicing Derricks Out of Every 100 Producers



One Franks telescoping servicing derrick on wheels, costing approximately what 10 derricks would cost, will service 100 wells, thus saving the cost of 90 individual permanent production derricks. Before you install individual derricks, investigate what several major oil companies are doing with the Franks servicing derrick.

FRANKS PIONEERED DRILLING RIGS ON WHEELS

FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS

FRANKS PIONEERED DERRICKS ON WHEELS

TULSA, OKLAHOMA

Drawer 137, Whittier Sta., Tulsa, Okla. *Cable Address:* FRANSI

Export Office: 149 Broadway, New York, N. Y.

Individually Designed

TO MEET YOUR EXACT OPERATING CONDITIONS

TYPE 57J
with steam jacketed body and quick opening type inner valve.

TYPE 4357
with integral mounted Wizard pilot and low left V-port inner valve.

TYPE 57T
with cooling fin, 1500 lb. body and top and bottom guided plug type inner valve.

TYPE 461
with manual control of inner valve. Equipped with angle type body.

TYPE 57T
with high left skirt guided V-port inner valve.

TYPE 57F
with forged steel body and needle point inner valve.

TYPE 516
Multiple spring type for high pressure service.

Today's Highly Specialized Processes Demand Special Control Valves

Practically every control problem is different — that is why we believe the control valve should be carefully selected, designed and constructed for each specific set of operating conditions. For over fifty years FISHER has made this belief their policy. During this time FISHER Engineers have designed and developed hundreds of different controllers to solve thousands of complicated control problems. Today they are ideally qualified to accurately size, select and furnish control valves particularly adapted to your service.

WHAT IS YOUR CONTROL PROBLEM?

Discuss it with your nearest FISHER Sales Engineer. He will gladly take full responsibility for determining the exact requirements of your service. From his detailed specifications, your control valves will be built. Every FISHER control valve you buy is guaranteed to have been tested under the actual pressure and operating conditions of your service. Call in a FISHER Sales Engineer today! There's no obligation whatever on your part.

FISHER DIAPHRAGM MOTOR VALVES

FISHER GOVERNOR COMPANY 216 Fisher Bldg., Marshalltown, Iowa

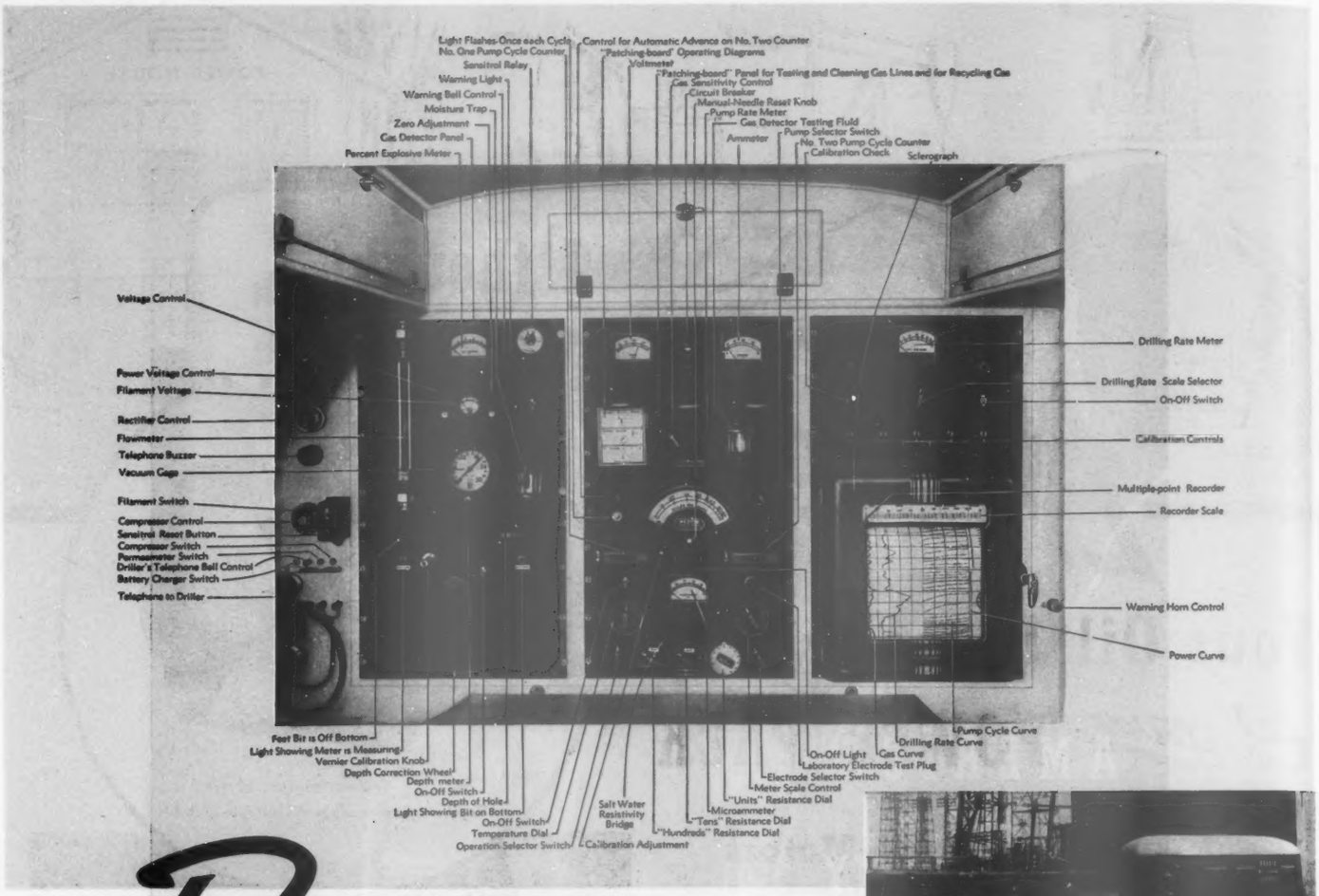
PUMP GOVERNORS • PRESSURE REGULATORS • PILOT OPERATED REGULATORS • BACK PRESSURE VALVES • RELIEF VALVES • LEVER VALVES • FLOAT VALVES • LIQUID LEVEL CONTROLLERS • STRAINERS • AIR AND GAS FILTERS • STEAM TRAPS • GAS REGULATORS • AUTOMATIC CONTROLS OF SPECIAL DESIGN

In the jungle, the strength of an elephant is legendary. In the oil field, American Super HEAVY-DUTY Roller Bearings are known for THEIR brute-strong yet flawlessly smooth performance. No load's too great, no strain too severe for these oil-field-engineered bearings. Absolute precision combines with adequate reserve strength to keep heavy duty rig equipment running smoothly even under the weights, strains and impacts imposed by deep-well operations. Specify "Americans" when you buy rig equipment—consult our engineers on any roller-bearing problem.

AMERICAN ROLLER BEARING COMPANY, PITTSBURGH, PA.

Pacific Coast Office: 321 W. Pico St., Los Angeles, Cal.

AMERICAN *HEAVY DUTY* **ROLLER BEARINGS**



Direct formation information thru mud analysis

Baroid Well Logging Service, by analyzing the content of the pore spaces of the formation being drilled, gives *direct* information as to the type of formation the bit is penetrating. Instruments (see panel shown above) which have been perfected for sensitivity and accuracy indicate promptly and accurately whether formations being penetrated contain gas, oil or salt water. In addition, a rate of penetration and drilling power curve are supplied. Baroid Well Logging Trailers also contain apparatus for core analysis.

Baroid Well Logging Service has been particularly valuable in both wildcat wells, and on completions in locating gas-oil interfaces.

Baroid Well Logging Trailers can be leased with operating crews or they can be leased without operators, in which case Baroid service men train oil company engineers.

Send for Bulletin L-101 which illustrates and describes Baroid Well Logging Service in detail.

BAROID
Well Logging
SERVICE

FORMATION INFORMATION THROUGH MUD ANALYSIS

BAROID SALES DIVISION
National Lead Company
BAROID SALES OFFICES
LOS ANGELES • TULSA • HOUSTON

Electrify

Your Oil Lease with a *Century* POWER PACK

Above — Century Splashproof Motor
Below — Century Type ACGR Generator

Century Splashproof Motors

For pumping units, designed to absorb shock loads and provide long life — low maintenance cost to equipment. Protected for outdoor operation.

Century Generators

Close regulating alternating current generators— with extremely simple control. Where public service current is not available this combination electrification system provides the simplest operation.

MOTOR. In oil fields throughout the world, operators are cutting operating and maintenance costs of continuous field operation with Century Type SCT Splashproof Pumping Unit Motors.

Primarily this motor accomplishes such savings in two ways — it has a specially engineered high starting torque to start a tough load; it has a high slip which means that the motor speed pulls down when the load comes on. Because the motor slows down against maximum power peaks, using energy stored up in its own armature and the pump jack counterweight, it cushions the impact on your equipment. The result is a reduction in jolts and jars, longer life to gears, bearings, chains and other vital parts.

GENERATOR. Century Type ACGR Generators — Where public service current is not available, an engine generator set with a Century Type ACGR Close Regulating Generator will keep pumping costs to a minimum. It maintains the voltage for Century Type SCT Pumping Unit Motors within permissible limits without any accessory devices. No rheostat, meters or control panels are required. Depending on load per motor and size of generator, from 10 to 30 wells can be pumped from one generator set.

For complete information on all the advantages offered by Century Motors and Generators for oil field use, see your regular supply store or your nearest Century Motor Specialist. It will pay you to find out how the correct Century Motor for each specific job will cut *your* maintenance and operating costs.

Century MOTORS

CENTURY ELECTRIC COMPANY

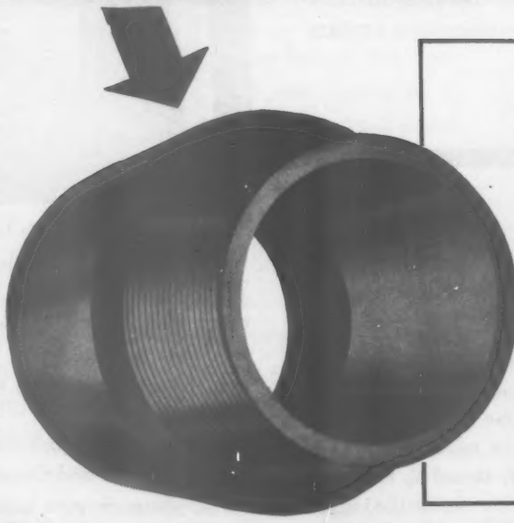
1806 Pine Street St. Louis, Missouri

Offices and Stock Points in Principal Cities

One of the Largest Exclusive Motor Manufacturers in the World

For TOUGHER joints that won't strip...use NICKEL STEELS

The longer your string, the more you need stronger, tougher tool joints. The "Shrink-Grip" Tool Joint manufactured by Reed Roller Bit Co., Houston, is shrunk onto the drill pipe. This "Shrink-Grip Method of Safety Control" bridges over the danger point and gives added support. For added safety, Reed specifies an especially selected Nickel-chromium steel, heat treated to increase its normally high mechanical properties and lengthen its life.



Close-up of Reed "Shrink-Grip" tool joint. In addition to improved mechanical properties, the especially selected Nickel alloy steel used in this vital unit offers two important production advantages: ease of machining at high hardness levels and uniform response to heat treatment.

➡ Your consultation is invited regarding oil field and refinery applications of steels, irons and non-ferrous alloys strengthened and toughened with Nickel.

Years of experience have proved beyond question that Nickel alloy steels meet the severe demands of oil production equipment. For heavily stressed oil field applications, Nickel steels are insurance against failure from excessive wear, shock overloads, temperature extremes, corrosives and fatigue strains. Tough, long-lived Nickel steels "take a load off your mind."

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

PENBERTHY PRODUCTS

Reflex

DROP FORGED STEEL LIQUID LEVEL GAGE

EMPTY SPACE SHOWS **WHITE** | LIQUID SHOWS **BLACK**

* * *

Transparent

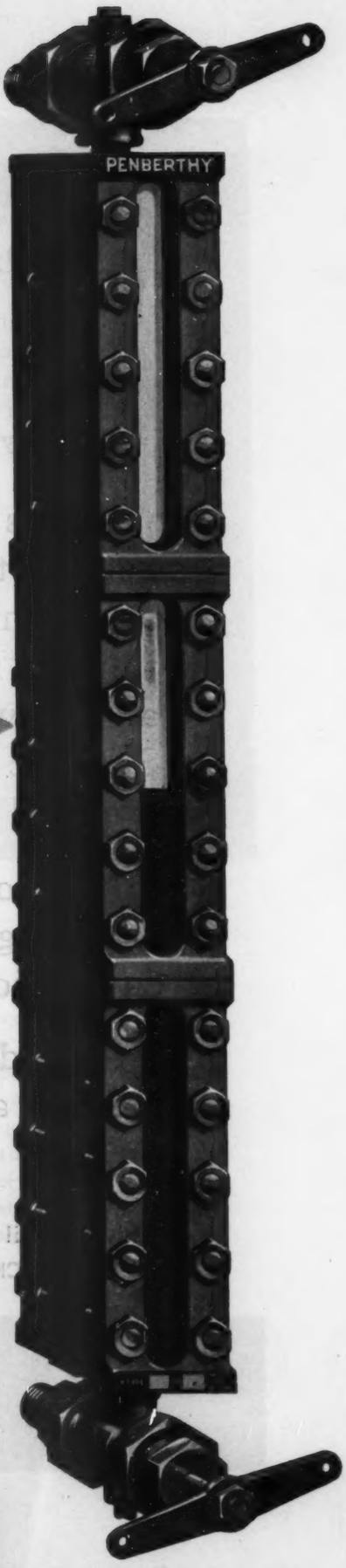
DROP FORGED STEEL LIQUID LEVEL GAGE

USED TO OBSERVE COLOR AND DENSITY OF LIQUIDS UNDER HIGH PRESSURES, AND/OR TEMPERATURES

These gages are made of alloy temperature resisting steel and are of the highest quality throughout. Liquid chamber (both single and multiple section) is made from a solid block of steel to assure perfect alignment and rigidity. Frame has extra heavy beam at each end and glass chamber is accurately machined to contour of glass providing full metal backing for gaskets. Gage valves are drop forged steel with stainless trim.

These gages are available in any length and for various pressures and temperatures. All Penberthy gages conform with A. P. I.—A. S. M. E. requirements.

PENBERTHY INJECTOR CO.
DETROIT, MICHIGAN
Canadian Plant: WINDSOR, ONTARIO



Anxious to make more

Things are going very nicely The plant is functioning well.... What I am anxious to thrash out with you is the possibility of still more increasing our output.... Also, I am very anxious to see you about a polymerizer

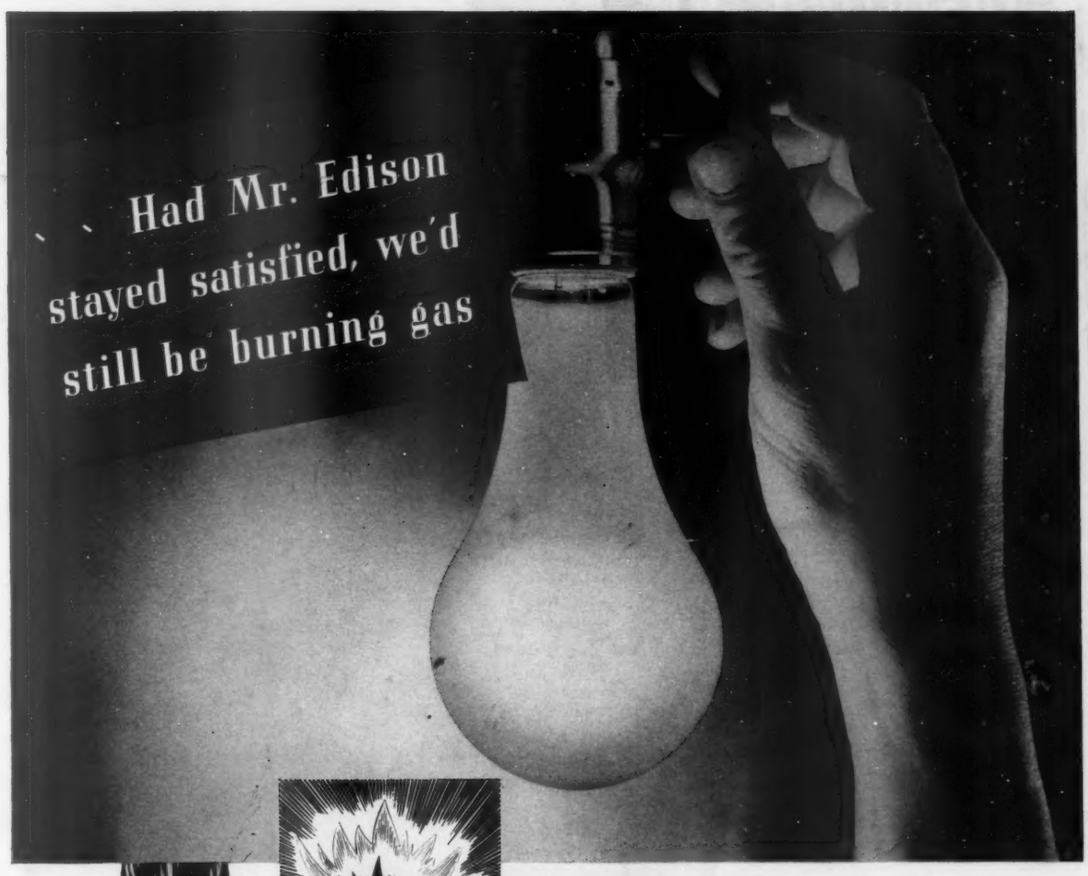
That's a letter from a Mid-Continent refiner to Universal and he is talking about his Dubbscracking plant The unit is "functioning well," running for all it's worth and making high yields Still he can't make enough Dubbs-cracked gasoline to go around

No wonder he wants to increase his cracking capacity and add a U. O. P. catalytic poly unit

A good many refiners are in the same position and are doing likewise

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor



WICKWIRE ROPE

Rope progress, too, is born of discontent. To be satisfied with the rope you are using does not lower your rope costs. Wickwire Spencer has proven this point and has built its reputation as a quality rope manufacturer by inducing "satisfied" people to use a Wickwire Rope. Both Regular Lay and Wisscolay Preformed Wickwire Ropes are consistently producing lower rope costs by virtue of longer service life. Order a Wickwire Rope the next time you buy. Wickwire Spencer will rest its case on the resulting cost figures.

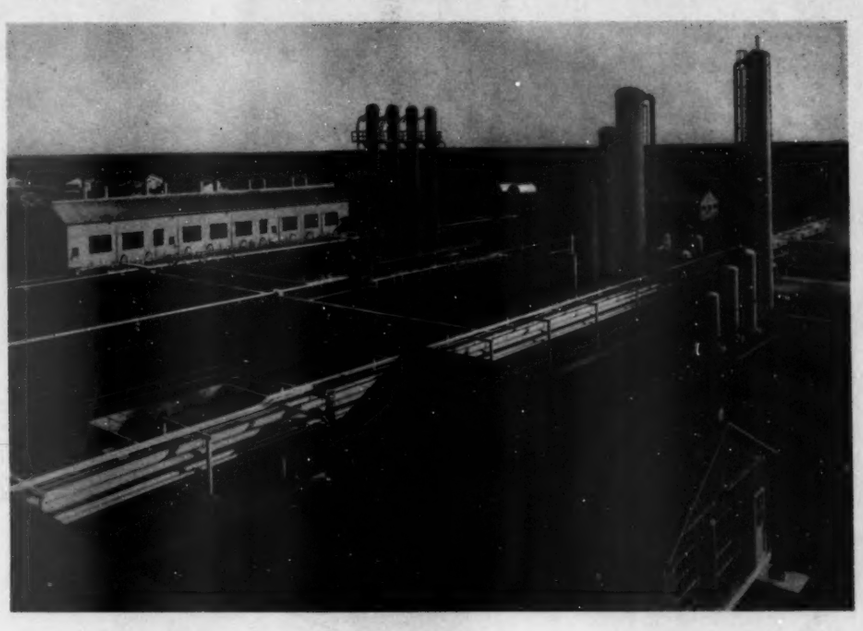
Cast iron pipe installed for drilling operation by a prominent West Coast oil company

CAST IRON PIPE

For Longer Life and Economy

IF your refinery management looks to you to keep down plant maintenance per barrel of crude, be thankful for cast iron pipe. It is, as you know, a reliable, long-lived, low-cost and adaptable material for cooling and condensing coils, run-down and discharge lines, salt water disposal and many other uses. It is available in bell-and-spigot, plain and threaded ends, and flanged types, or with stuffing-box type mechanical joints, in diameters from 1¼ to 84 inches. Address inquiries to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago, Ill.

140 million cu. ft. 1500 lbs. w. p. Absorption Unit and Pressure Maintenance, designed for 2500 lbs. Recently completed in Corpus Christi area.



Whether you call it . . .

Distillate Recovery—or Recycling—or Condensate Recovery . . .

we have designed and installed the three types of plants now processing gas for the Recovery of Distillate with Pressure Maintenance; i.e.,—

1. Recovery through low temperature, utilizing Regenerative Cooling Cycle;
2. Recovery by high pressure Absorption Process;
3. Recovery through low temperature, using Mechanical Refrigeration Cycle.

Our Research—Engineering and Designing Departments—important factors in planning plant economy—are part of our service.

Complete handling of Engineering, Designing, Installation, Testing and Starting the Plant—delivering to the customer the complete operating unit.

Our engineers will be glad to work out your problems with you. Write us for more information.

- *Distillate Recovery Plants*
- *Gas Dehydration Plants*
- *Compressor Stations*
- *Natural Gasoline Plants*
- *Stabilization Plants*

PARKHILL-WADE
CONSULTING AND CONSTRUCTION ENGINEERS
1625 SOUTH ALAMEDA STREET
LOS ANGELES CALIFORNIA

AFFILIATED WITH

THE STEARNS-ROGER MANUFACTURING CO.

1720 CALIFORNIA STREET • DENVER, COLO.

ARE YOU READY FOR MORE BUSINESS?

"An increased outlet for crude oil of 100,000 bbls. per day larger than the present production is in prospect by the end of the year," reports The Oil and Gas Journal of Kansas oil development.

Are you prepared to profit by taking advantage of increased production and sudden fluctuations? If you're using KG&E POWER you are. The flexibility of KG&E SERVICE is on the job to give you all the additional power you may need — ready to supply it quickly with little or no expense to you.

And you get many advantages with KG&E SERVICE. It lends itself to automatic operation, it's cheap, it's economical, it's dependable, it frees your money for investment or operations, you get free engineering service . . . but why not get the complete story?

Just call or write. A trained engineer will be glad to give all the information you desire without charge or obligation. Whether you're interested in production, pumping, or refining, you'll discover KG&E POWER can serve you best.

KANSAS GAS AND ELECTRIC COMPANY

Electricity is Cheap

OFFICES AT WICHITA — NEWTON — EL DORADO — ARKANSAS CITY — PITTSBURG — INDEPENDENCE

The Oil Bank of America

is just ANOTHER NAME for the . . .

NATIONAL BANK OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

BAASH-ROSS

"MAKE 'EM LIGHT AND EASY TO HANDLE," SAID THE DRILLING CREWS . . .

So BAASH-ROSS Type "C-U" Rotary Slips are as light as any full-strength slips on the market. They're unitized and perfectly balanced for quick, easy operation; they stand firmly on the rotary or floor without tipping over; the handles have solid steel loops to protect the hands, and are hinged and properly bent to clear the elevators safely. Drilling crews will find their expressed desires in BAASH-ROSS Type "C-U" Rotary Slips.

"THEY'VE GOT TO BE SAFE FOR THE LONGEST DRILLING STRINGS," SAID THE SUPERINTENDENTS AND ENGINEERS.

They are! The liners are provided with pyramid wickers that take a firm grip without cutting or marring the pipe. Flexible hinges between the heat treated alloy steel body sections insure proper vertical and circumferential alignment with the drill stem, and all body sections set at the same level in the master bushings to insure against crimping the pipe. The liners fit in dovetail slots and are safely held in place by a vertical T-head key. Your drilling strings will give longer, safer service when handled with Type "C-U" Slips.

"GET THE PRICE AWAY DOWN, Down, down!" SAID THE MEN WHO PAY THE BILLS. . . .

We have! BAASH-ROSS Type "C-U" Rotary Slips are moderately priced—yet the material and workmanship are the best that modern metallurgy and manufacturing skill can provide. And they save you money in reduced equipment investment, because each body size accommodates interchangeable liners for from 4 to 6 or more sizes of pipe. Here is a real opportunity to save with safety—and to the satisfaction of every group concerned with drilling.

SEND FOR THE BAASH-ROSS TYPE "C-U" ROTARY SLIP BULLETIN

BAASH ROSS

TOOL COMPANY

OIL WELL TOOLS · SPECIALTIES

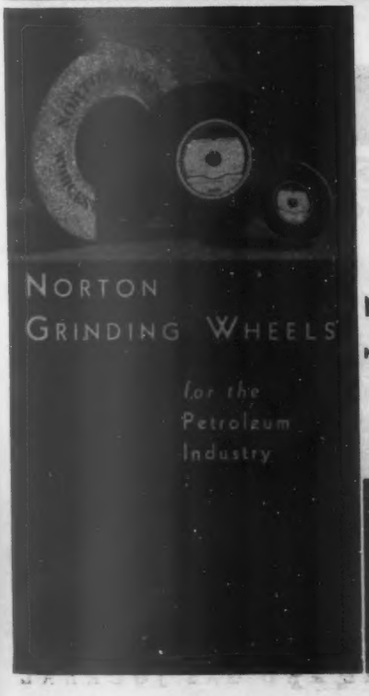
LOS ANGELES

HOUSTON · NEW YORK

For Every Grinding Job

Large or Small—
Production or Maintenance

WHETHER you are using grinding for the manufacture of oil field tools and equipment or for their repair and maintenance in the field you'll like Norton Grinding Wheels. There is a complete line in the proper size and shape, abrasive and bond, grain, grade and structure for each job. And each wheel is scientifically designed for the particular job that it is to do. Norton engineering service will be glad to help you in selecting the proper wheel for any operation. Get in touch with us direct or through the Norton distributor in your neighborhood.



This leaflet lists the sizes and types of Norton Grinding Wheels commonly used for the principle grinding jobs in the oil industry. Send for a copy today—no obligation. Use the coupon below.

NORTON COMPANY
WORCESTER, MASS.

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W-766

NORTON ABRASIVES

NORTON COMPANY, WORCESTER, MASS.

Please send your leaflet on Norton Grinding Wheels for the Petroleum Industry.

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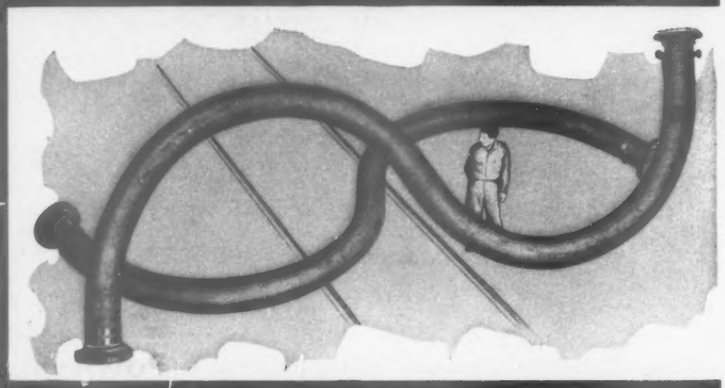
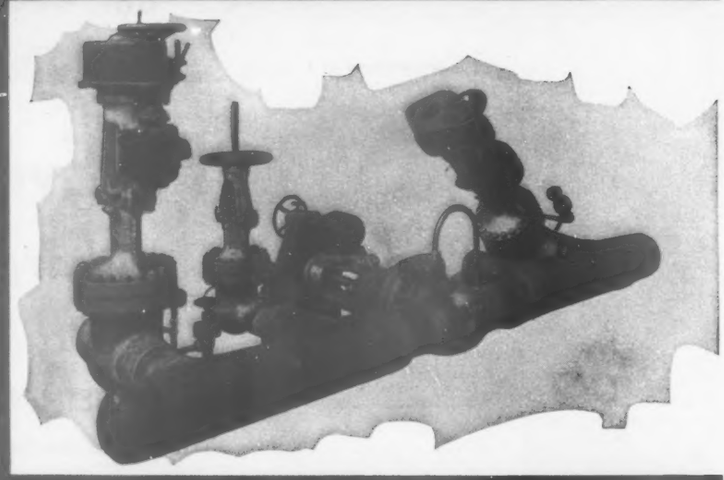
MIDWEST *Alloy* PIPING



14" O.D. Chromium-Molybdenum pipe bends with Van Stone laps. Entire bends annealed after fabrication.



Carbon-Molybdenum header stress relieved in furnace before welding on valves which were welded by preheating and stress relieving with induction method.

PRESSURE piping users have found that alloy tubing presents many problems and difficulties not encountered when low carbon steel materials are used. Some have learned by bitter experience that the utmost care must be exercised in selecting a fabricator . . . one who has wide experience in the special manufacturing procedures required by the various alloys. It is also essential that the fabricator's welders be skilled on welding alloy tubing . . . and that he have the heat treating furnaces and other special equipment needed.

Each of the three Midwest plants is thoroughly familiar with all the "do's" and "don'ts" peculiar to the fabrication of alloy tubing. Midwest has welders qualified on the alloys . . . and Midwest has the special equipment so essential to the successful fabrication of alloy tubing.

Whenever you need alloy piping, you will find it definitely advantageous to get in touch with the nearest Midwest office.

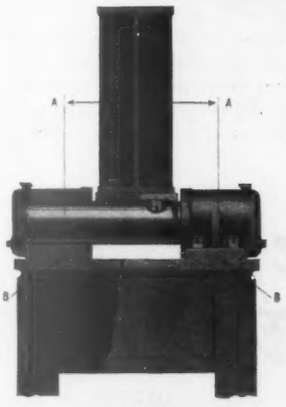
MIDWEST PIPING & SUPPLY COMPANY, INC.

Main Office: 1450 S. Second Street, St. Louis, Mo.

Plants: St. Louis, Passaic (N. J.) and Los Angeles • *Sales Offices:* Chicago—946 Marquette Building • Houston—1716 Second National Bank Building • Los Angeles—520 Anderson Street • New York—(Eastern Division) 30 Church Street • Tulsa—533 Mayo Building.

A *PLUS VALUE* IN "OILWELL" PUMPING UNITS

"OILWELL" SADDLE BEARING



A Wide spacing of bearings.

B Machined bases of the bearing housings rest on machined top of samson post.

TROUBLE-FREE SADDLE BEARINGS

SADDLE BEARINGS in "Oilwell" pumping units are designed for trouble-free performance and long life. They are fully-enclosed, oil-bath, bronze-bushed bearings with oil seals making them dust-proof and weather-proof.

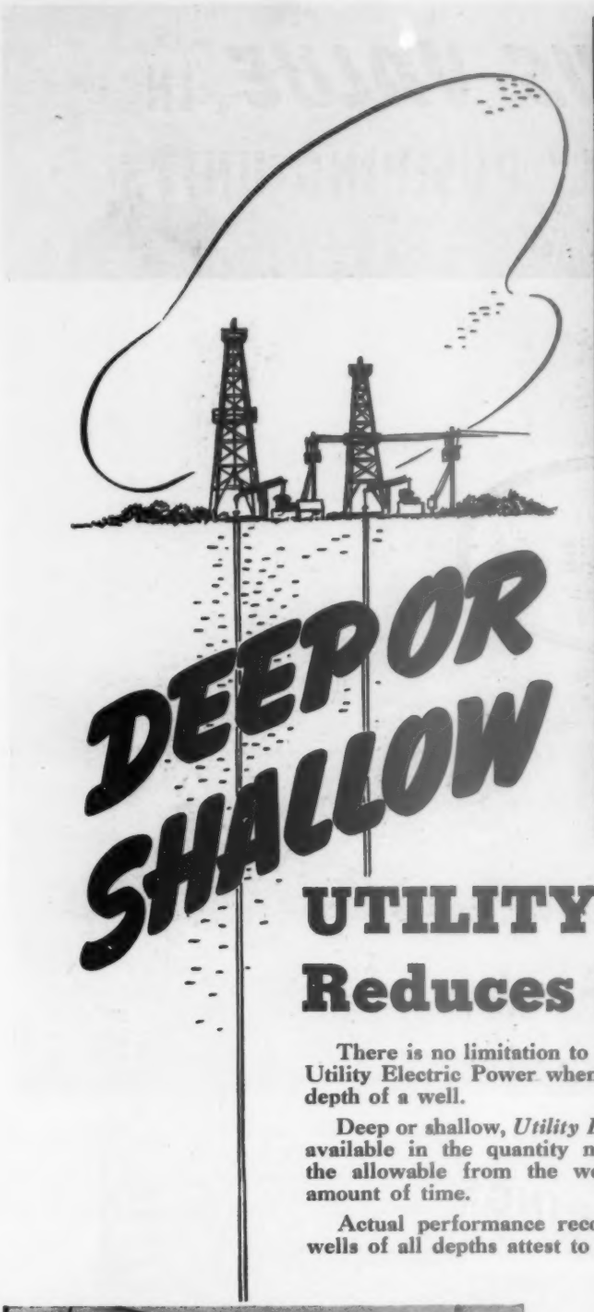
Machined-base bearing housings and machined-top samson post assure accurate alignment.

Widely spaced bearings resist twisting, minimizing bearing wear.

Trouble-free saddle-bearing construction is but one of the several *plus values* you get in "Oilwell" Pumping Units. Investigate before you buy.

OIL WELL SUPPLY COMPANY

Branch Stores in All Oil Fields
United States Steel Corporation Subsidiary



DEEP OR SHALLOW

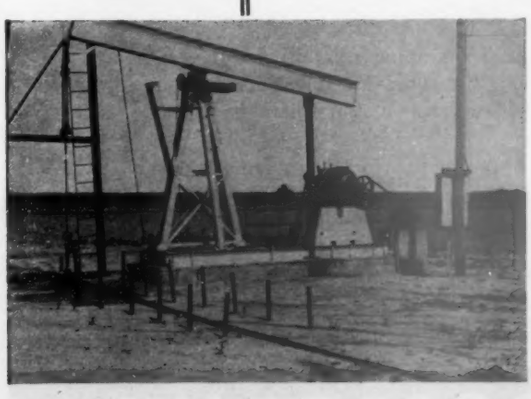
UTILITY ELECTRIC POWER
Reduces Pumping Costs!!!

There is no limitation to the efficiency of Utility Electric Power when it comes to the depth of a well.

Deep or shallow, *Utility Electric Power* is available in the quantity needed to obtain the allowable from the well, in the least amount of time.

Actual performance records of pumping wells of all depths attest to the fact that the *final* cost of using Utility Electric Power is extremely low, with lifting efficiency at its peak.

Facts based on actual performance records are available to you. Why not ask your electric power service company about them. You're sure to find a more modern and economical solution to your own power problems.

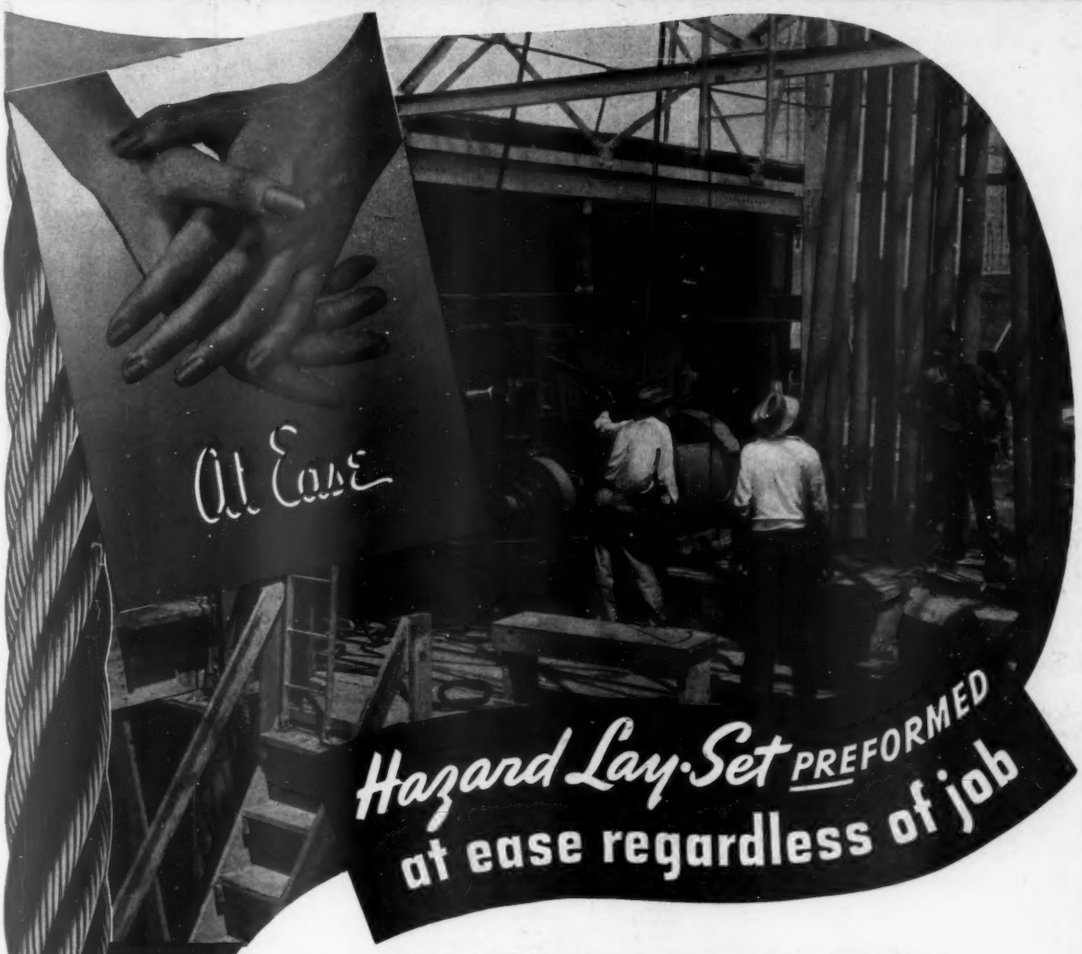


Use Utility Electric Power

PROFIT! BY USING Utility ELECTRIC POWER

* *The Petroleum Electric Power Association is the outgrowth of a desire on the part of electric power companies to render greater service, through cooperative effort, to the Petroleum Industry.*

PETROLEUM ELECTRIC POWER ASSOCIATION



Hazard Lay-Set PREFORMED at ease regardless of job

● Whether it is drilling or making round trips Hazard LAY-SET Preformed Rotary Lines are so completely "at ease" they give much longer and faster service. "At ease" is just another way of saying that Hazard LAY-SET is preformed; that it is free of the locked-up stresses which cause crankiness, whipping and kinking tendency. Being preformed at the mill, LAY-SET is a flexible, easy-to-handle line—a line that resists rotating in sheave grooves and has amazing resistance to bending fatigue. Having little tendency to whip, Hazard LAY-SET spools better. And it's safer for the derrick man because broken wires lie flat and in place—refusing to wicker out to tear hands and damage both itself and machinery. For your next rotary drilling line specify Hazard LAY-SET Preformed and benefit by its greater dollar value.

HAZARD WIRE ROPE DIVISION

Established 1846 • **Wilkes-Barre, Pennsylvania**

Branches or Distributors in All Important Oil Fields

In Business for Your Safety

Where *TEETH* count !

. . . whether "On the Range" in Nature's fierce attacks—or in attacking the various rock formations in quest of oil—IT'S THE TEETH THAT COUNT.

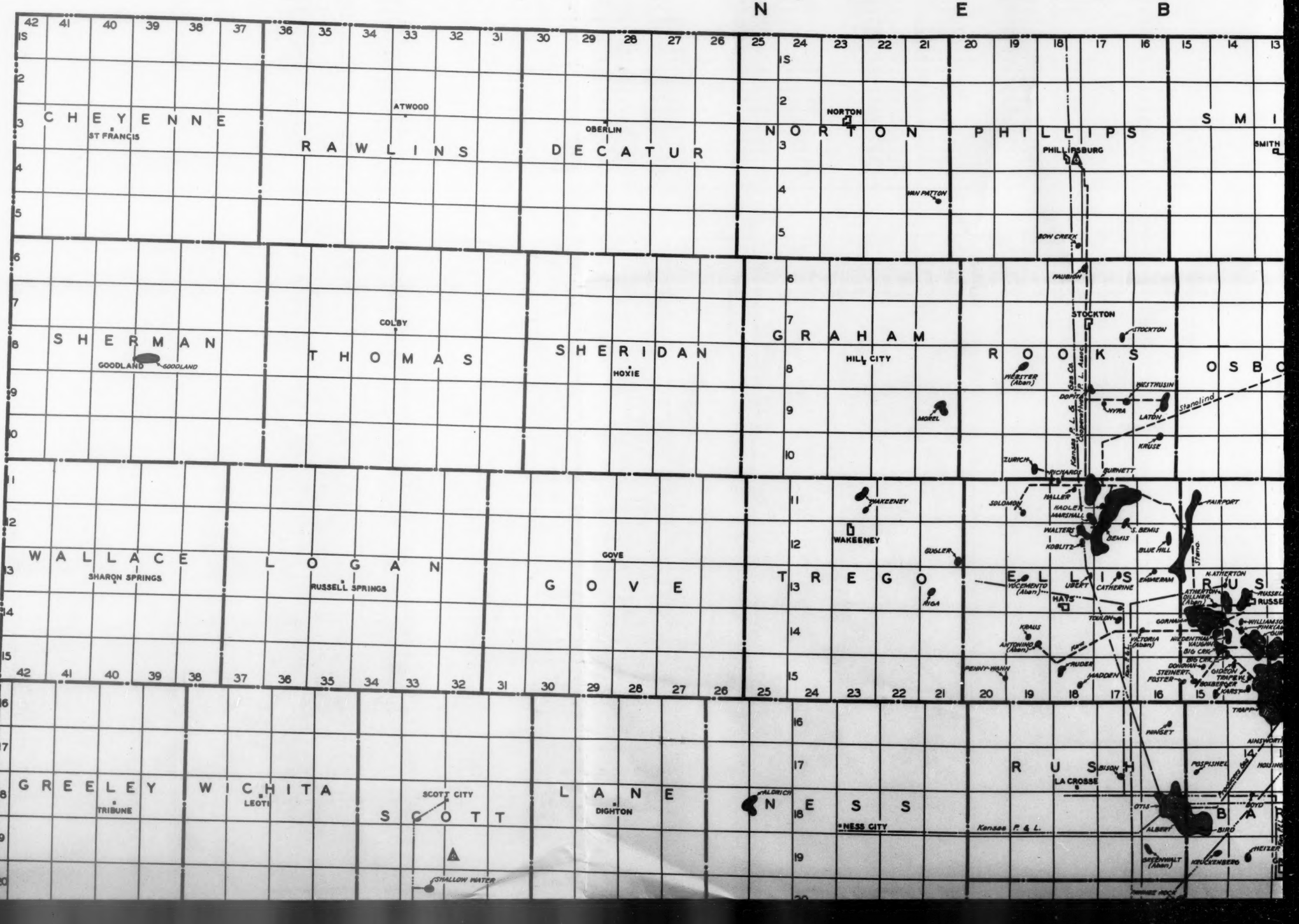
For every range of formations encountered, there is a "specialized" type of Hughes Rock Bit to give you the maximum service.

Here is shown a Hughes Type "OWS" Tricone with especially designed hard faced teeth for tough formations such as dolomite, dolomitic lime rock, slate and hard shale.

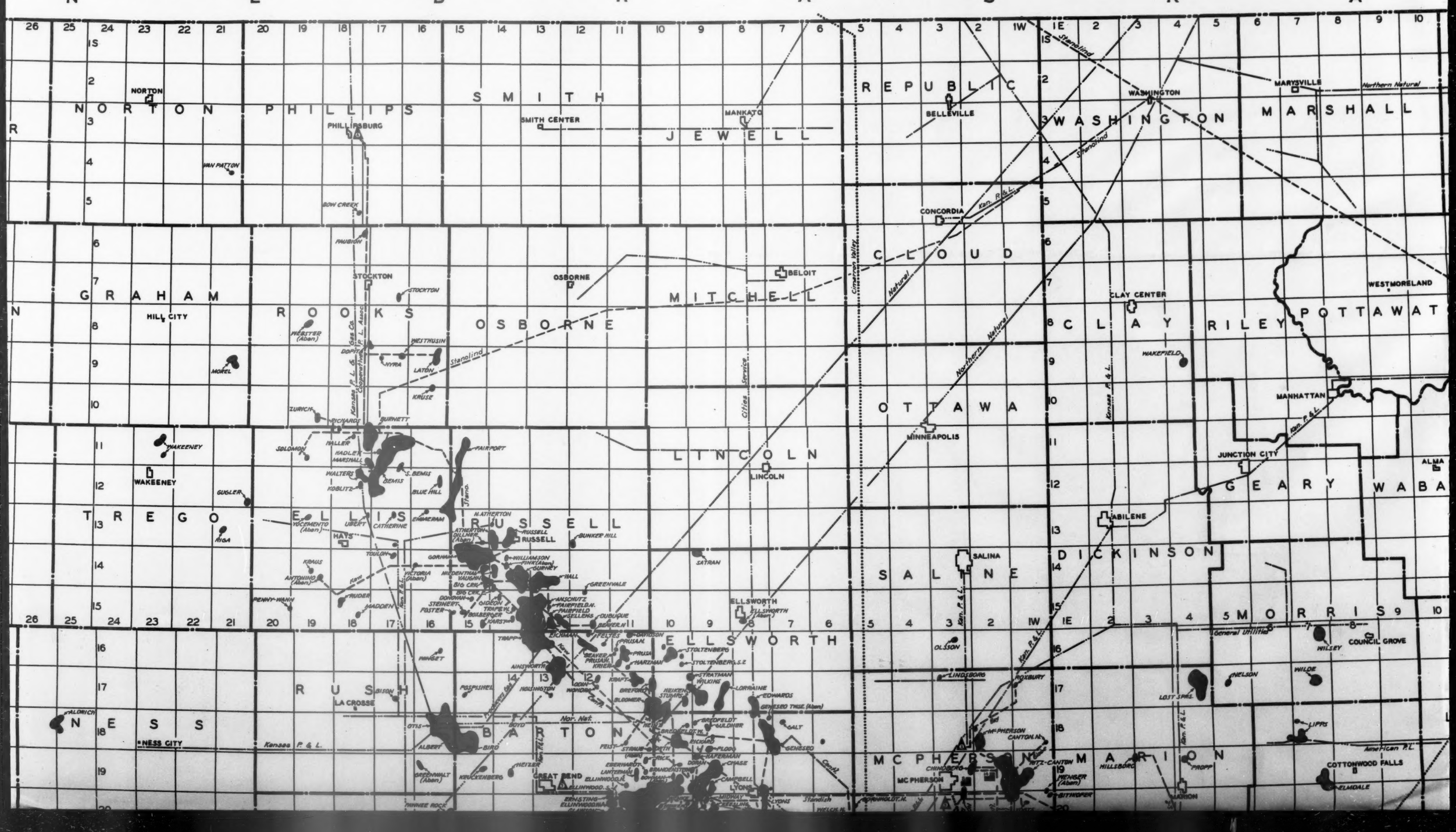
TYPE "OWS"
Sizes 3 ¼"
and Larger

HUGHES TOOL COMPANY · HOUSTON, TEXAS

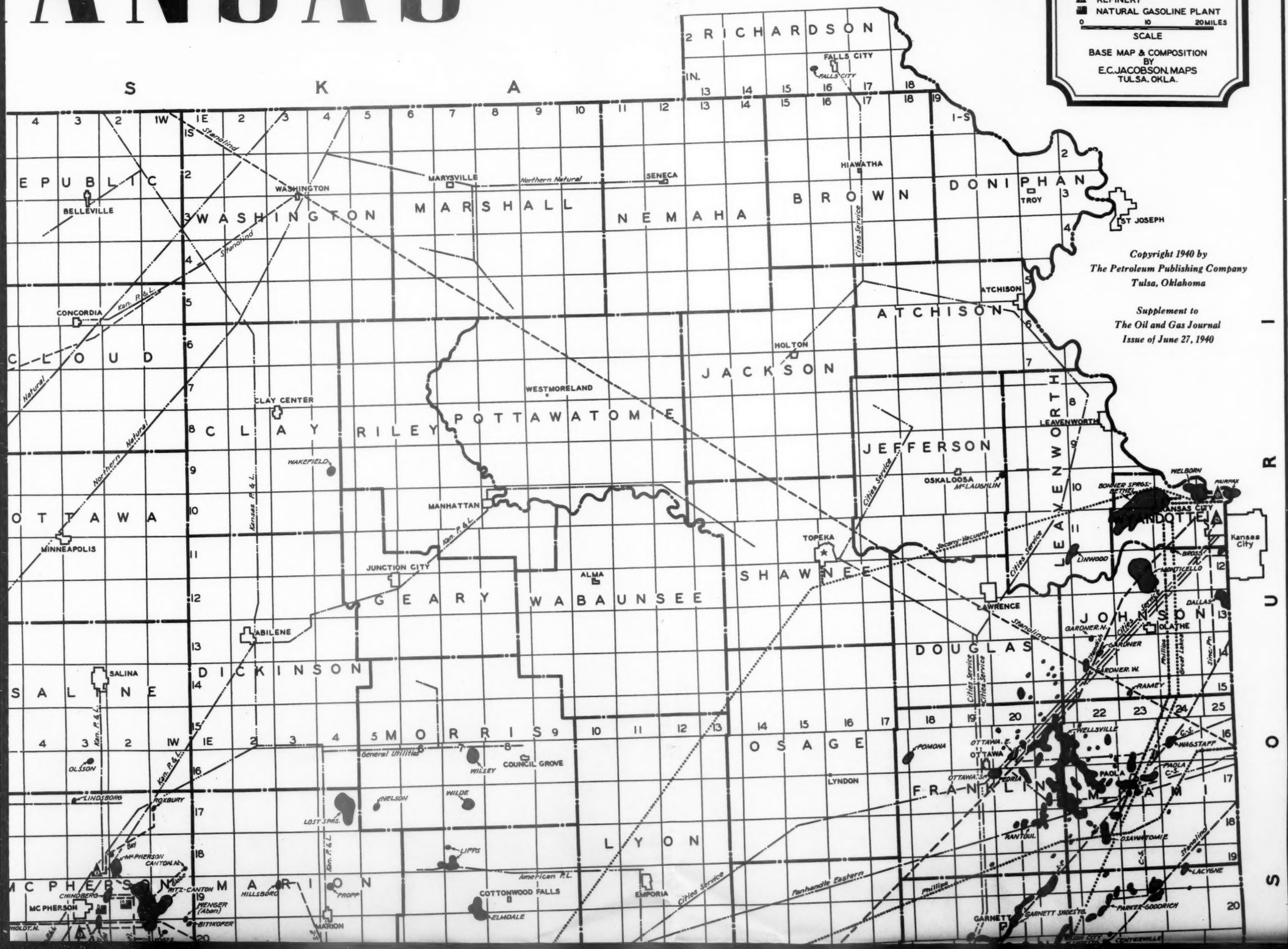
The Oil and Gas Journal's MAP



urnal's MAP OF KANSAS



ANSAS


LEGEND
OIL FIELD
GAS FIELD
GASOLINE PIPE LINE
OIL PIPE LINE
NATURAL GAS PIPE LINE
REFINERY
NATURAL GASOLINE PLANT
0 10 20 MILES
SCALE
BASE MAP & COMPOSITION BY E.C. JACOBSON, MAPS TULSA, OKLA.
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WALLACE
LOGAN
GOVE
TREGO
ELLIS
RUS
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GOVE
HAYS
RYCA
VOCEMENTO (Aban)
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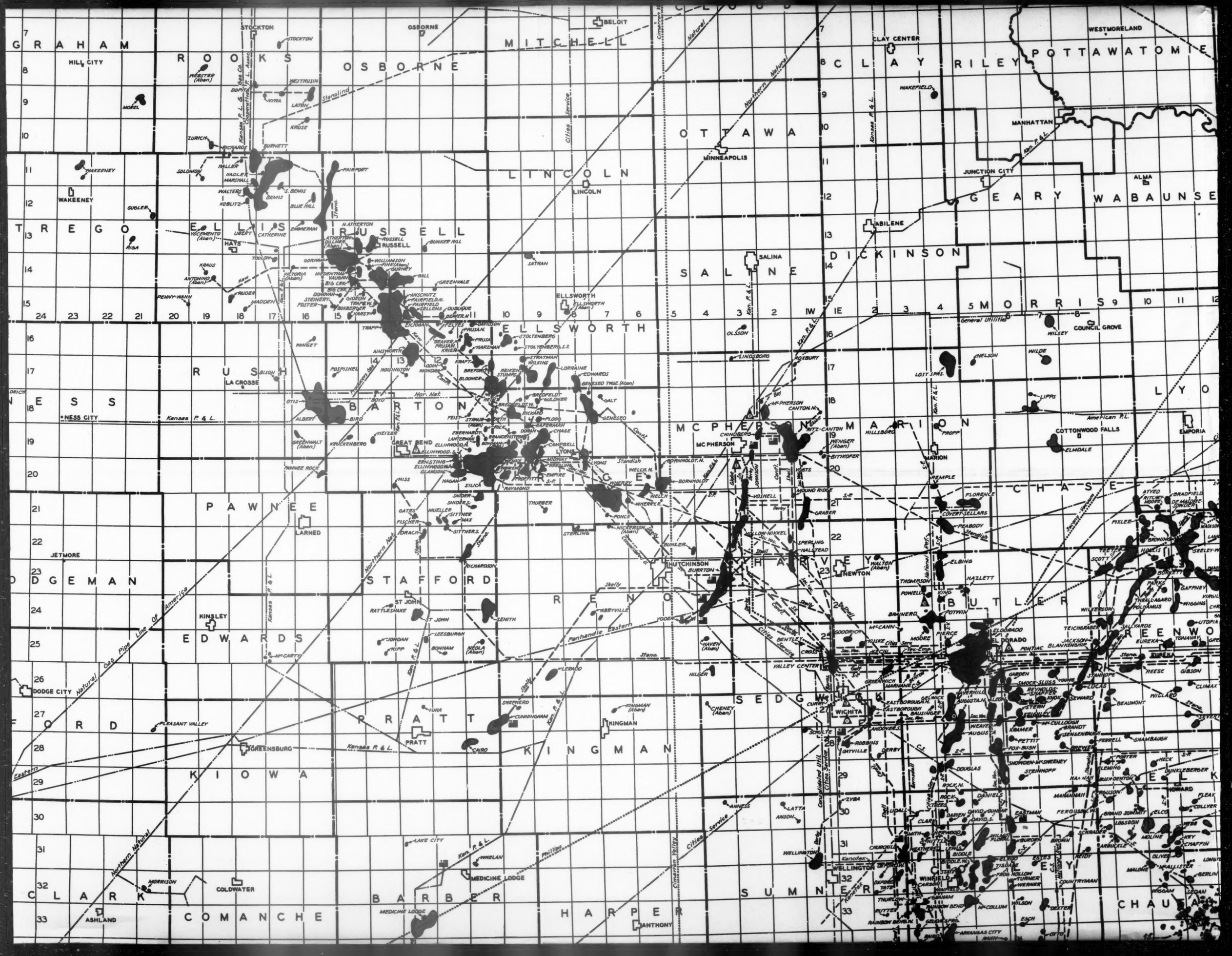
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BUTLER
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PRATT
KINGMAN
SEDGWICK
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GULDNER
RICHARD
FELST
STRAUB
PLOOG
HAPERMAN
CHASE
EBERHARDT
LANTERMAN
BRANDENSTEIN
DORAN
CAMPBELL
LYONS
MIDWAY
HEIZER
ERNSTING
ELLINWOOD W.
GLANSDORF
ELLINWOOD S.
ELLINWOOD
GREAT BEND
KRUCKENBERG
GREENWALT (Aban)
PAWNEE ROCK
HISS
SILICA
HAGAN
RAYMOND
EMPIRE
WHERRY
WHERRY E.
WELCH
WELCH N.
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BORNHOLDT N.
VOSHELL
MOUND RIDGE
GRABER
THURBER
SNIDER
SNIDER S.
GATES
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MUELLER
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MAX
SITTNERS
PONCE
NICKERSON (Aban)
STERLING
DRACH
LARNED
JETMORE
HODGEMAN
RICHARDSON
BUHLER
HUTCHINSON
BURRTON
HOLLOW-NIKKEL
SPERLING
HALSTEAD
NEWTON
WALTON (Aban)
ELBING
HALLETT
THOMPSON
POWELL
KING
POTWIN
BRAINERD
PIERCE
MCCANN
GOODRICH
KISKE
MOORE
EL DORADO
PONTIAC
JACKSON
BLANKENSHIP
TEICHGRABER
SALLYARDS
EUREKA
TONAWAY
UTOPIA
GASPNEY
WIGGINS
WILKERSON
THRALL-AGARD
POLLAMUS
VIRGIL
PARKS
BORCHETT
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MADISON
LAMONT
BROWNING
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PEABODY
STRONGHEART
FLORENCE
COVERT-SELLARS
ATYEO
BRADFIELD
DE MALORIE-SNYDER
PITCHY-WOOFE
HARRIS
SCOTT
YEATES
ABBYVILLE
ZENITH
ST JOHN
RATTLESNAKE
KINSLEY
JORDAN
KIPP
LEESBURGH
BONHAM
NEOLA (Aban)
MCCARTY
LEBAUDO
HAVEN (Aban)
HILGER
VALLEY CENTER
GREENWICH
HARMANEC
WICHITA
EASTBOROUGH
BAUSINGER
RELWICK
CURRENT
AUGUSTA N.
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WEAVER
ANDOVER S.
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ROBBINS
GATTVILLE
SCHULTE
DERBY
KRAMER
PETTIT
FOX-BUSH
BREWER
FERRELL
SHAMBAUGH
SNOWDEN-MCSWEENEY
STEINHOFF
MCCULLOUGH
BRANDT
SENSENBUSH
DOUGLAS
ROCK
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DAVID
DAVID S.
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SMITH
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CHURCHILL
WELLINGTON
WINFIELD
CARSON
ARKANSAS CITY
DAVIS
RUTTER
RAINBOW BEND
GRAHAM
MCCOLLUM
WILSON
ESCH
DEITER
OTTO
COUNTRYMAN
ESTES
TISDALE
FROG HOLLOW
TURNER
WERNER
OLIVER
MALONE
HALLISTER
BERLIN
WIGGAM
SEDAN
CHAFFIN
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MOLINE
LOBSDON
FERGUSON W.
GRAND SUMMIT
ELCO
COLLYER
HOWARD
FLEAK
DUNKLEBERGER
SHEPHERD
CUNNINGHAM
PRATT
IUKA
CAIRO
KINGMAN (Aban)
KINGMAN
CHENEY (Aban)
GREENSBURG
PLEASANT VALLEY
DODGE CITY
LAKE CITY
MEDICINE LODGE
WHELAN
MORRISON
ASHLAND
COLDWATER
ANTHONY
HARPER
ANNESS
LATTA
ANSON
ZYBA
UDALL
CLEARWATER
ARGONIA
CALDWELL
ANTHONY
HARPER
MEDICINE LODGE
BARBER
COMANCHE
CLARK
SUMNER
WESTMORELAND
CLAY CENTER
WAKEFIELD
MANHATTAN
JUNCTION CITY
ALMA
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MINNEAPOLIS
SALINA
OLSSON
LINDSBORG
ROXBURY
MCPHERSON
CANTON N.
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RITZ-CANTON
CHINDBERG
MC PHERSON
HILLSBORO
WENGER (Aban)
BITIKOFER
PROPP
MARION
REMPLE
WILSEY
COUNCIL GROVE
WILDE
NELSON
LOST SPRS.
LIPPS
COTTONWOOD FALLS
ELMDALE
EMPORIA
WINFIELD
Natural Gas Pipe Line Of America
Northern Natural
Kansas P. & L.
Panhandle Eastern
Cities Service
Phillips
Skelly
Stano
Standish
Shell
Sinclair
Gulf
Conoco
Kansas-Nebraska
Consolidated Oil
Consolidated Utilities
Consolidated Hill
Kanotex
Derby
Sec. Ben.
Sec. Inc.
Sec. Mo.
Sec. Emp.
Sec. Ins.
Sec. Wic.
Sec. Ohio
Sec. Pan.
Sec. Kan.
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Sec. Iowa
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Sec. S.C.
Sec. N.C.
Sec. Va.
Sec. W.Va.
Sec. Ky.
Sec. Tenn.
Sec. Md.
Sec. Del.
Sec. N.J.
Sec. Pa.
Sec. N.Y.
Sec. Conn.
Sec. R.I.
Sec. Mass.
Sec. Vt.
Sec. N.H.
Sec. Me.
Sec. Alaska
Sec. Hawaii
Sec. P.R.
Sec. V.I.
Sec. Guam
Sec. Samoa
Sec. Trust Territories
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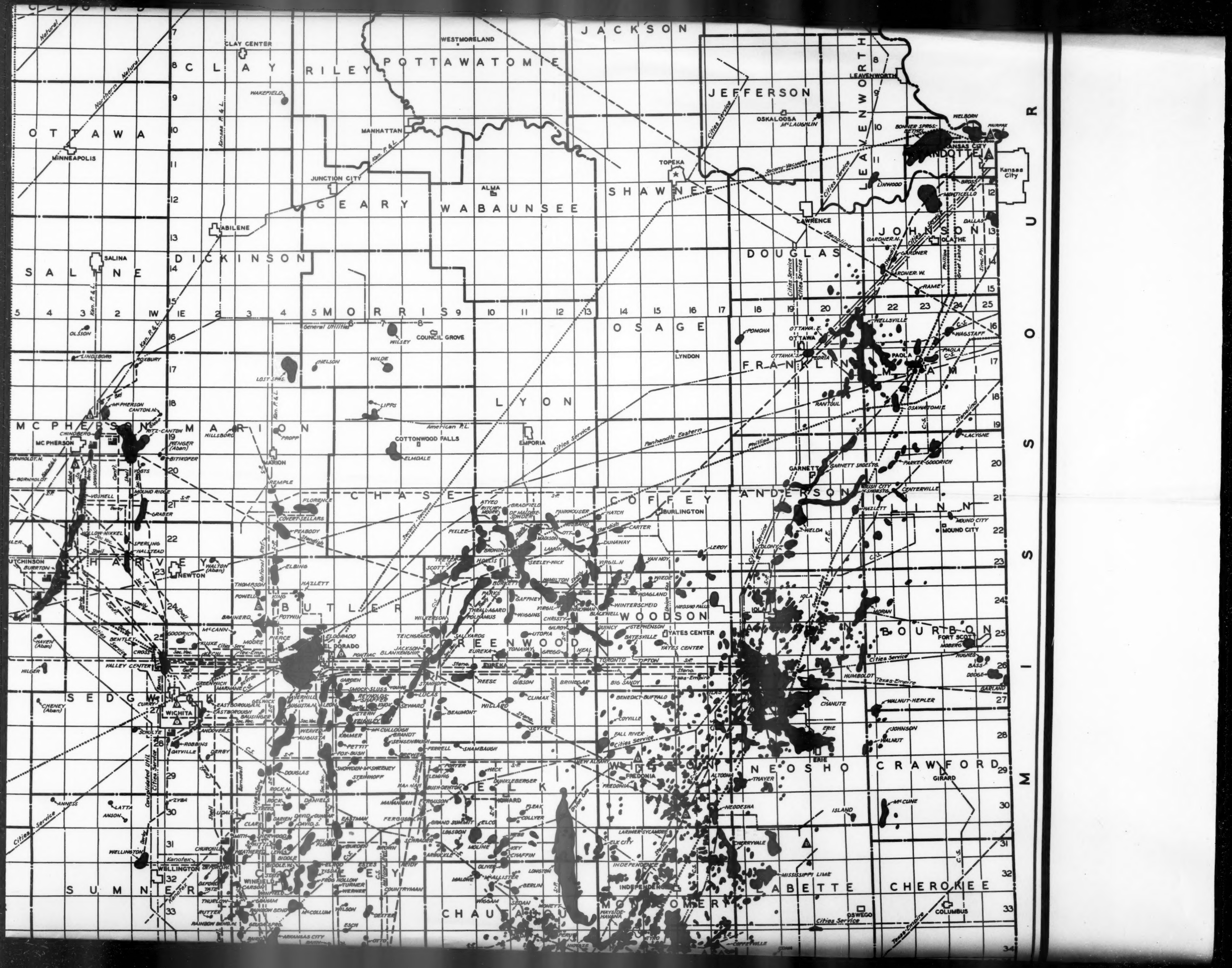
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SALINE
DICKINSON
MORRIS
OSAGE
FRANKLIN
MIAMI
LYON
MC PHERSON
MARION
CHASE
COFFEY
ANDERSON
LINN
HARVEY
BUTLER
WOODSON
BOURBON
SEDGWICK
GREENWOOD
ALLEN
NEOSHO
CRAWFORD
SUMNER
CHAUTAUQUA
MONTGOMERY
LABETTE
CHEROKEE
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Northern Natural
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Sinclair
Shell
Sohio
Skelly
Sunray
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Consolidated Util.
Stanolind
Western Natural
Union
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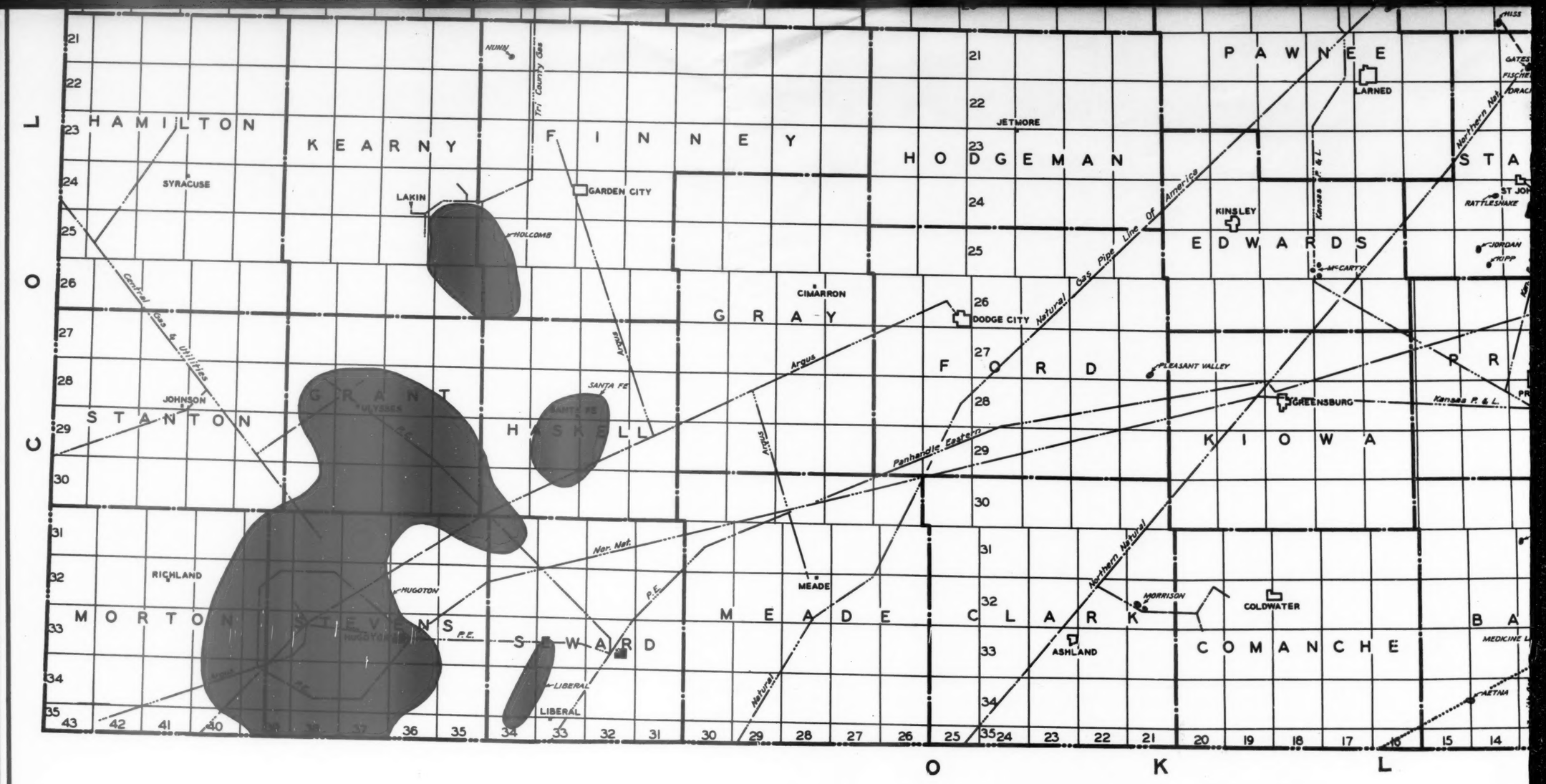


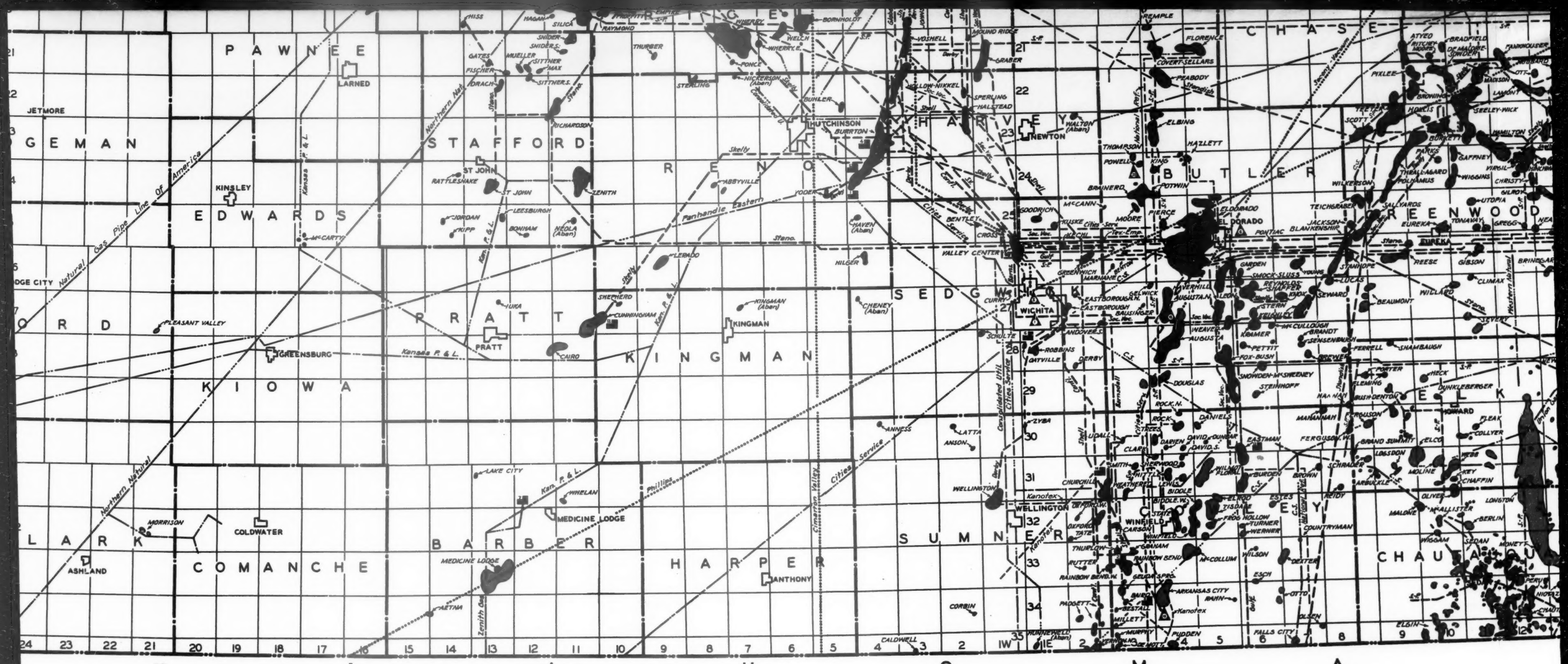
Refineries

Company and plant location—	Crude oil cap.†	Cracking cap.†	Type of refinery*	Type of cracking plant
1. Barsco Oil Co., Wichita	5,000	2,500	S-C	Dubbs
2. Bay Pet. Corp., McPherson	4,000	2,500	S-C	
3. Chanute Ref. Co., Chanute		1,000	C	
4. Cooperative Ref. Assoc., Phillipsburg	3,500	1,800	S-C	Dubbs
5. Derby Oil Co., Wichita	8,000	3,300	S-C-A	Dubbs
6. El Dorado Ref. Co., Eldorado	7,000	3,500	S-C	Winkler-Koch
7. Falcon Ref. Co., Great Bend	2,500	.....	S	
8. Fredonia Oil & Ref. Co., Fredonia	250	.....	S	
9. Globe Oil & Ref. Co., McPherson	16,000	3,000	S-C-L	Winkler-Koch
10. Kanotex Ref. Co., Arkansas City	12,000	4,000	S-C-A	Donnelly
11. National Ref. Co., Coffeyville	8,000	4,000	Comp.	Own
12. Phillips Pet. Co., Kansas City	23,000	9,000	S-C	Own-Dubbs
13. Roper Pet. Co., Parsons	550	.....	S	
14. Shallow Water Ref. Co., Shallow Water	2,000	500	S-C-A	Hall
15. Sinclair Ref. Co., Coffeyville	12,000	7,000	S-C-L-W	Sinclair 600
16. Sinclair Ref. Co., Kansas City	11,000	7,000	S-C	Sinclair 600
17. Skelly Oil Co., Eldorado	23,000	15,000	S-C-L-A	Winkler-Koch
18. Socony-Vacuum Oil Co., Augusta	23,000	20,000	S-C-A	
19. Standard Oil Co. (Ind.), Neodesha	7,400	2,640	S-C	Combination
20. Vickers Pet. Co., Potwin	4,000	2,000	S-C	Dubbs
Total	172,200	93,240		

*S—skimming, C—cracking, A—asphalt, L—lubricating oil. †Bbl. daily.

Oil and Gas Fields

Abbyville	24-S	8-W	Benton	26-S	3-E	Brewer	28-S	7-E	Clawson	20-S	11-W	Eastborough	27-S	2-E	Ferguson (Gas)	30-S	8-E	Greenwich	26-
Aetna (Gas)	34-S	14-W	Berlin (Gas)	32-S	11-E	Brinegar	28-S	13-E	Climax	27-S	11-E	Eastman	31-S	6-E	Ferguson West	30-S	8-E	Greenwalt	19-
Ainsworth	16-S	13-W	Biddle	32-S	4-E	Bross (Gas)	12-S	24-E	Coffeyville (Gas)	34-S	17-E	Eberhardt	19-S	11-W	Ferrell	28-S	8-E	Gregg (Gas)	25-
Albert	18-S	15-W	Biddle West	32-S	4-E	Brown	31-S	7-E	Collyer	30-S	11-E	Edna	34-S	18-E	Fink	14-S	14-W	Gugler	12-
Aldrich	18-S	25-W	Big Creek	14-S	15-W	Browning	22-S	10-E	Colony	22-S	19-E	Edwards	18-S	8-W	Fischer	21-S	12-W	Guldner	18-
Altoona	29-S	16-E	Big Creek East	14-S	14-W	Buhler	22-S	5-W	Corbin	34-S	2-W	Elchman	15-S	13-W	Fleak	30-S	11-E	Gurney	14-
Andover South	27-S	2-E	Big Sandy	26-S	14-E	Bunker Hill	13-S	12-W	Countryman	32-S	7-E	Elbing	23-S	4-E	Fleming	29-S	9-E		
Anness	30-S	4-W	Bird	18-S	15-W	Burden	31-S	6-E	Covert-Sellars	21-S	4-E	Elco (Gas)	31-S	9-E	Florence	21-S	5-E	Hadley	11-
Anschutz	15-S	13-W	Bison (Gas)	17-S	17-W	Burkett	23-S	10-E	Coyville	27-S	14-E	Eldorado	25-S	5-E	Foster	15-S	15-W	Haferman	19-
Anson (Gas)	30-S	2-W	Bitikofer	20-S	1-W	Burnett	11-S	18-W	Cross	25-S	1-W	Elgin	35-S	10-E	Fox-Bush	29-S	5-E	Hagan	20-
Andover South	27-S	2-E	Big Sandy	26-S	14-E	Burnett	23-S	4-W	Cunningham	27-S	10-W	Elk City (Gas)	31-S	13-E	Fredonia	29-S	15-E	Hall	14-
Anness	30-S	4-W	Bird	18-S	15-W	Burton	21-S	21-E	Curry	27-S	1-W	Ellinwood North	19-S	11-W	Frog Hollow	32-S	5-E	Haller	11-
Anschutz	15-S	13-W	Bison (Gas)	17-S	17-W	Bush City Shoestring	29-S	9-E				Ellinwood West	20-S	11-W				Halstead	22-
Anson (Gas)	30-S	2-W	Bitikofer	20-S	1-W	Bush-Denton			Dallas	13-S	25-E	Ellsworth (Gas)	15-S	8-W	Gaffney	24-S	11-E	Hamilton	24-
Antonino	14-S	19-W	Blackwell	24-S	13-E	Cairo	28-S	11-W	Darien	30-S	4-E	Elmdale (Gas)	20-S	7-E	Galt	18-S	7-W	Hanna	29-
Arbuckle	31-S	9-E	Blankenship	26-S	8-E	Caldwell	35-S	3-W	David	30-S	4-E	Elrod (Gas)	32-S	5-E	Garden	28-S	6-E	Harrman	16-
Arkansas City (Gas)	34-S	4-E	Bloomer	17-S	11-W	Campbell	19-S	9-W	David South	31-S	4-E	Emmeram	13-S	16-W	Gardner	14-S	22-E	Hatch	21-
Atherton	13-S	14-W	Blue Hill	12-S	16-W	Carey	35-S	14-E	Davidson	16-S	11-W	Empire	20-S	9-W	Garland (Gas)	26-S	25-E	Haven	25-
Atherton North	13-S	14-W	Bolton	33-S	14-E	Canton North	18-S	1-W	De Malorie-Sowder	22 S	10-E	Erie	28-S	20-E	Garnett (Shoestring)	20-S	20-E	Haverhill	27-
Atyeo	21-S	10-E	Bonham	25-S	12-W	Carson	32-S	3-E	De Mott	35-S	3-E	Ernsting	20-S	12-W	Gates	21-S	13-W	Hazlett	24-
Augusta	28-S	4-E	Bonner Sps. (Bethel Gas)	10-S	23-E	Carter	22-S	14-E	Derby (Gas)	28-S	2-E	Esch (Gas)	33-S	6-E	Gelwick	27-S	4-E	Hazlett (Gas)	21-
Augusta North	27-S	4-E	Bornholdt	20-S	5-W	Catherine	13-S	17-W	Dexter (Gas)	33-S	7-E	Estes (Gas)	32-S	6-E	Geneseo	18-S	8-W	Heck (Gas)	29-
			Bornholdt North	20-S	5-W	Centerville	21-S	22-E	Dillner	13-S	15-W	Eureka	26-S	10-E	Geneseo Townsite	18-S	8-W	Heiken	17-
Baird	34-S	3-E	Bow Creek	5-S	18-W	Chaffin (Gas)	32-S	10-E	Dodge (Gas)	26-S	25-E				Geuda Springs	34-S	3-E	Heinz	18-
Bass (Gas)	26-S	25-E	Bowman	19-S	10-W	Chanute	27-S	18-E	Donovan	15-S	15-W	Fairfax (Gas)	10-S	25-E	Gibson	26-S	11-E	Heizer	19-
Batesville (Gas)	25-S	14-E	Boxberger	15-S	15-W	Chase	20-S	9-W	Dopita	8-S	17-W	Fairfield	15-S	13-W	Gideon	15-S	14-W	Hilger	26-
Bausinger	27-S	3-E	Boyd	18-S	14-W	Chautauqua	35-S	12-E	Doran	19-S	10-W	Fairfield North	15-S	13-W	Gilroy	25-S	12-E	Hillsboro	19-
Beaver	16-S	12-W	Bradfield	21-S	10-E	Cheney	27-S	4-W	Douglas	29-S	4-E	Fairport	12-S	15-W	Goodland (Gas)	8-S	39-W	Hinchman	24-
Beaver North	16-S	12-W	Brainerd	25-S	3-E	Cherryvale	32-S	17-E	Drach	22-S	13-W	Fall River	28-S	13-E	Goodrich	25-S	1-E	Hiss	20-
Beaumont (Gas)	27-S	8-E	Brandenstein	19-S	10-W	Cherryvale (Gas)	32-S	17-E	Dubuque	15-S	12-W	Falls City	35-S	7-E	Gorham	14-S	15-W	Hittle	31-
Bemis	11-S	17-W	Brandt	28-S	7-E	Chindberg	19-S	3-W	Dumler	14-S	15-W	Fankhouser	21-S	12-E	Graber	21-S	1-W	Hoagland	24-
Bemis South	12-S	17-W	Bredfeldt	18-S	9-W	Christy	24-S	12-E	Dunaway	22-S	13-E	Faubion	6-S	18-W	Graham	33-S	3-E	Hoisington	17-
Benedict-Buffalo	27-S	16-E	Bredfeldt West	18-S	10-W	Churchill	31-S	2-E	Dunbar	30-S	5-E	Feist	18-S	11-W	Grand Summit	31-S	8-E	Holcomb (Gas)	25-
Bentley	25-S	1-W	Breford	17-S	11-W	Clark	31-S	4-E	Dunkleberger	29-S	10-E	Feltes	16-S	12-W	Greenvale	15-S	12-W	Hollis	22-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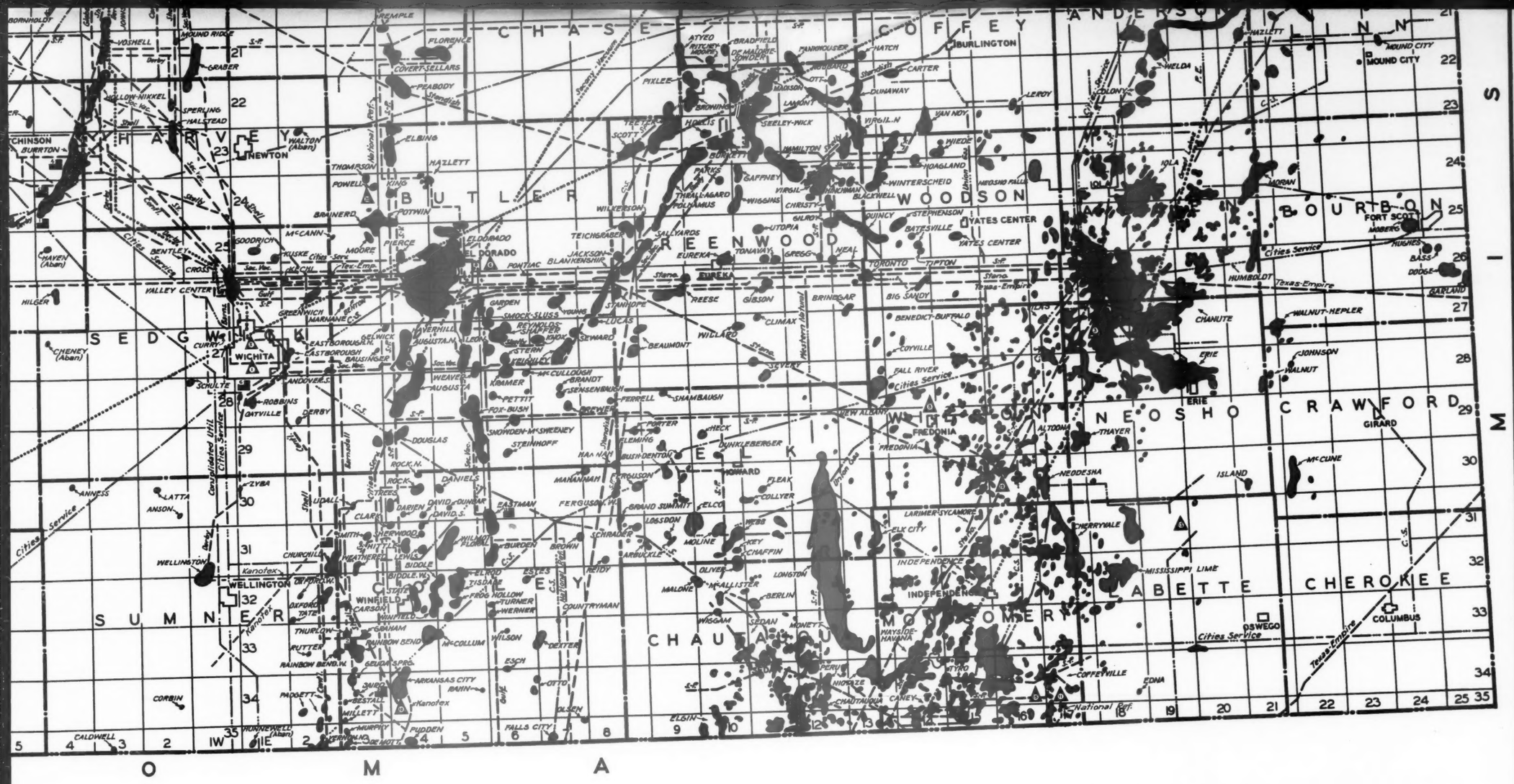

	28-S	6-E	Oatville	28-S	1-E	Pontiac	26-S	7-E	Rock North	30-S	4-E	State	32-S	4-E	Ubert	13-S	18-W	Wellsville	16-S	21-E
	30-S	22-E	Odin	17-S	12-W	Porter	29-S	8-E	Roxbury	17-S	1-W	Steinert	15-S	15-W	Udall	30-S	3-E	Wenger	20-S	1-W
	10-S	20-E	Oliver	32-S	10-E	Pospishel	17-S	15-W	Russell	13-S	14-W	Steinhoff	29-S	6-E	Utopia	25-S	11-E	Wenke	20-S	10-W
	18-S	2-W	Olsen	35-S	7-E	Potwin	24-S	4-E	Rutter	33-S	2-E	Stephenson (Gas)	25-S	14-E				Wenke West	20-S	10-W
odge	33-S	13-W	Olsson	16-S	3-W	Powell	24-S	3-E	Ruder	15-S	18-W	Sterling	22-S	8-W	Valley Center	26-S	1-W	Werner (Gas)	32-S	6-E
odge (Gas)	33-S	13-W	Orth	18-S	10-W	Proffitt	20-S	10-W				Stern	27-S	6-E	Van Noy	23-S	15-E	Westhusin	9-S	17-W
	20-S	9-W	Osawatomie	18-S	22-E	Propp (Gas)	19-S	4-E	St. John	24-E	13-W	Stratman	17-S	10-W	Van Patton	4-S	21-W	Whelan	31-S	11-W
	34-S	3-E	Otis	18-S	16-W	Prusa	16-S	11-W	Sallyards	25-S	9-E	Straub	18-S	11-W	Vaughn	14-S	14-W	Wherry	21-S	7-W
Lime (Gas)	32-S	18-E	Otis (Gas)	18-S	16-W	Prusa North	16-S	11-W	Santa Fe (Gas)	29-S	32-W	Stockton	7-S	17-W	Vernon North	35-S	2-E	Wherry East	21-S	6-W
s)	25-S	24-E	Ott	22-S	13-E	Prusa West	16-S	11-W	Satran (Gas)	14-S	9-W	Stoltenberg	16-S	10-W	Vestal	34-S	3-E	Wiede	23-S	15-E
s)	31-S	10-E	Ottawa East (Gas)	16-S	20-E	Pudden	35-S	4-E	Schrader (Gas)	31-S	8-E	Stoltenberg S.E.	16-S	10-W	Victoria	14-S	16-W	Wiggins	24-S	11-E
	33-S	12-E	Ottawa S. (Gas)	17-S	19-E				Schulte	28-S	1-W	Stumps	18-S	10-W	Virgil	24-S	12-E	Wilde (Gas)	17-S	7-E
(Gas)	12-S	23-E	Otto (Gas)	34-S	6-E	Quincy	25-S	13-E	Scott	23-S	8-E	Sullivan	14-S	15-W	Virgil North	23-S	13-E	Wilkerson	25-S	9-E
	25-S	3-E	Oxford	32-S	2-E				Sedan	33-S	11-E	Vogts			Vogts	20-S	1-W	Wilkins	17-S	9-W
	24-S	21-E	Oxford West	32-S	2-E	Rahn	34-S	5-E	Seeley-Wick	23-S	11-E	Tate	32-S	2-E	Voshell	21-S	3-W	Willard	27-S	10-E
	9-S	21-W				Rainbow Bend	33-S	3-E	Sellens	15-S	13-W	Teeter	23-S	9-E				Williamson	14-S	14-W
	32-S	21-W	Padgett	34-S	2-E	Rainbow Bend West	33-S	2-E	Sensenbaugh	28-S	7-E	Teichgraber	25-S	9-E	Wagstaff	16-S	24-E	Wilmot-Floral (Gas)	31-S	5-E
Gas)	32-S	21-W	Paola	17-S	22-E	Ramey (Gas)	15-S	23-E	Severy (Gas)	28-S	11-E	Thayer	29-S	17-E	Wakeeney	11-S	23-W	Wilsey (Gas)	16-S	7-E
(Gas)	22-S	24-E	Parker-Goodrich	20-S	22-E	Rantoul	17-S	21-E	Seward	27-S	7-E	Thompson	24-S	3-E	Wakefield	9-S	4-E	Wilson	33-S	6-E
ge (Gas)	21-S	2-W	Parks	24-S	10-E	Rattlesnake	24-S	14-W	Shallow Water	20-S	33-W	Thrall-Agard	24-S	10-E	Walnut	28-S	21-E	Winfield	32-S	4-E
	21-S	12-W	Pawnee Rock	20-S	16-W	Raymond	20-S	10-W	Shambaugh	28-S	9-E	Thurber (Gas)	21-S	9-W	Walnut-Hepler	27-S	22-E	Winget	16-S	16-W
	35-S	3-E	Peabody	22-S	4-E	Reese	28-S	9-E	Shepard	27-S	10-W	Thurlow	33-S	3-E	Walters	12-S	18-W	Winterscheid	24-S	14-E
			Penny-Wann	15-S	20-W	Reidy	31-S	8-E	Sherwood	31-S	4-E	Tipton (Gas)	25-S	14-E	Walton	23-S	2-E	Wondra	17-S	10-W
	26-S	13-E	Peoria (Gas)	17-S	20-E	Remple	21-S	4-E	Silica	19-S	10-W	Tisdale (Gas)	32-S	5-E	Wayside-Havana	33-S	14-E			
	17-S	5-E	Peterson	14-S	15-W	Reynolds-Schaffer	27-S	6-E	Sittner	21-S	12-W	Tonavay	25-S	11-E	Weathered	31-S	3-E			
	30-S	16-E	Pettit	28-S	6-E	Richards	11-S	18-W	Sittner South	22-S	12-W	Toronto	28-S	13-E	Weaver	28-S	5-E	Yates Center	25-S	15-E
	25-S	11-W	Peru	34-S	12-E	Richardson	22-S	11-W	Smith	31-S	3-E	Toulon	14-S	17-W	Webb	31-S	10-E	Yocemento	13-S	19-W
ls (Gas)	24-S	17-E	Pierce	25-S	4-E	Richey-Moore	21-S	10-E	Smock-Sluss	26-S	5-E	Toulon North	13-S	17-W	Webster	8-S	19-W	Yoder	24-S	5-W
y	28-S	13-E	Pixlee	22-S	10-E	Rick	19-S	11-W	Snider	21-S	11-W	Trapp	15-S	13-W	Welborn (Gas)	10-S	25-E	Young	26-S	7-E
	22-S	7-W	Pleasant Valley (Gas)	27-S	21-W	Rickard	18-S	9-W	Snider South	21-S	11-W	Trapp West	15-S	14-W	Welch	21-S	6-W			
s)	14-S	15-W	Ploog	18-S	9-W	Riga	13-S	21-W	Snowden-McSweeney	29-S	6-E	Trees	30-S	4-E	Welch North	20-S	6-W	Zenith	24-S	11-W
	34-S	13-E	Polhamus	25-S	9-E	Ritz-Canton	19-S	1-W	Solomon	11-S	19-W	Turner	32-S	6-E	Welda	21-S	19-E	Zurich	10-S	19-W
	21-S	34-W	Pomona (Gas)	16-S	17-E	Robbins	26-S	1-E	Sperling	22-S	2-W	Tyro	28-S	8-E	Wellington	31-S	1-W	Zyba	30-S	1-E
	9-S	17-W	Ponce	21-S	7-W	Rock	30-S	4-E	Stanhope	28-S	8-E		34-S	15-E						

Natural-Gasoline Plants

Company and plant location—	Type of plant	Capacity*
1. Aldon Gasoline Co., P. O. Box F, Haven	Absp.	10,000
2. Barnsdall Oil Co., Oxford	Absp.	8,000
3. Cities Service Oil Co., Arkansas City	Absp.	15,000
4. Cities Service Oil Co., Burrton	Absp.	35,000
5. Cities Service Oil Co., Burrton	Absp.	25,000
6. Cities Service Oil Co., Wichita	Absp.	50,000
7. Kansas Power & Light Co., Topeka	Absp.	15,000
8. Kansas Power & Light Co., Topeka	Absp.	10,000
9. Northern Natural Gas Co., Hugoton	Absp.	15,000
10. Panhandle Eastern Pipe Line Co., Liberal	Absp.	75,000
11. Shell Oil Co., Inc., Oxford	Comp.	2,500
12. Skelly Oil Co., Cunningham	Absp.	15,000
13. Texas Co. (Del.), Atlanta	Absp.	7,400
14. Warren Petroleum Corp., Galva	Absp.	30,000

Absp.—absorption. Comp.—compression. *Gallons daily.

Pipe-Line Systems (Crude Oil)

Bareco Oil Co.
Bay Petroleum Corp.
Continental Oil Co.
Derby Oil Co., The (Pipe Line Dept.)
El Dorado Refining Co., The
Globe Oil & Refining Co., The (Kansas)
Gulf Oil Corp.
Kanotex Refining Co.
Kaw Pipe Line Co.
National Refining Co., The
Shell Pipe Line Corp.
Sinclair Refining Co. (Pipe Line Dept.)
Skelly Oil Co.
Socony-Vacuum Oil Co.
Standish Pipe Line Co.
Stanolind Pipe Line Co.
Texas-Empire Pipe Line Co., The